DEC 28 1921

GAS JOURNAL

LIGHT + HEAT + POWER + BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

VOL. CLVI. No. 3056.] LONDON, DECEMBER 7, 1921. [73RD YEAR. PRICE 1s.

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VOL. CLVI., No. 3056.] WEDNESDAY, DECEMBER 7, 1921. [73RD YEAR.

EDITORIAL NOTES.

Acumen in the Gas Business.

In the introduction to the valuable and (we hope it will prove) inspiring paper that Mr. W. J. Sandeman, of Croydon, read at the meeting of the Southern Association of Gas Engineers and Managers on Tuesday of last week, he said that, to his mind—notwithstanding the efforts of the British Commercial Gas Association—the gas trading side of the industry is in not a few places being sadly neglected. Confirmation was given to this by a remark in the speech contributed to the discussion by Mr. F. W. Goodenough, who as the Executive Chairman of the British Commercial Gas Association, has exceptional opportunities for judgment. And the feeling that all is not as it should be at the commercial end of the industry was also found underlying the remarks that Dr. Carpenter made at the luncheon on the occasion of the visit of the Institution of Gas Engineers to the East Greenwich Gas-Works not many weeks since. There is serious accusation in the allegations, both expressed and inferred; and not only accusation, but we know, from experience and observation, much truth. It can, in fact, be categorically asserted that there are some responsible men at the heads of gas undertakings who do not know what acumen in the gas trading business means. Policy and organization at the business end with some of them are shadowy things. Vision is myopic. Initiative is almost *nil*. Their enterprise has as a pre-eminent characteristic want of courage. Lethargy and indolence reveal themselves in the conditions met with in consumers' houses, in factories, and even in the street lamps, which often are found to be a splendid example of how not to do things. Much old business is lost that could be retained by proper policy and organization, and much new paying business that could be gained if sought for. There are the antitheses of these conditions. There are the gas undertakings whose standards of commercial policy, organization, methods, and enterprise are high, with ideals attaching that will raise the standards to still higher planes. There are gas undertakings whose place in contrast is below these; and whose practices go lower and lower from the best standards until there is reached those concerns in which the business is allowed very much to take such care of itself as it is capable of doing. The object of all far-seeing workers in the gas industry is to raise the level of commercial practices and ambitions until the gas industry has a universally good name in this respect; for those workers know that with the migrations and journeyings of the public, the effects of the inefficiencies in one place are not confined to the ill done to the local business, but have to be countered, and do no good, in districts in which high efficiency does prevail. Inefficiency advertises itself perhaps with more vigour and insistence than efficiency, though not with such happy and remunerative results.

One way in which to promote a good commercial policy and organization in the gas industry is to learn what others are doing where the standards in these respects are high, and then to exercise the brains not necessarily in the application in detail and minutiæ of those high standards, but in ascertaining how far, with requisite change to suit circumstances, they can be applied, and even improved upon. The paper read by Mr. Sandeman is the work not of superficiality but of penetration and study in the light of practical experience. It is, indeed, one of the best essays in the presentment of what is required, and what should be done, at the gas sales end that has been published in such (considering the vastness and ramifications of the subject) brief form. The Croydon policy, organization, and methods bulk largely, but only by way of illustration. Principles are the main considerations in the paper—and naturally with a commercial-technical man of such recognized ability at the head of the Croydon Company's distribution and sales department, the principles advocated are those that are applied. Though applied, Mr. Sandeman is not completely satisfied. He wants to go farther. The efficient man generally does; the inefficient man says that there is sufficiency in things as they are, and, with change and progress going on around him, he allows matters to stagnate. There never was a time more than now when, in the gas industry, the most advanced efficiency is required in the sales departments of gas undertakings. Therefore Mr. Sandeman's paper should be critically examined together with the discussion, for there are in both the inspiration and incentive for all to try to do better in developing the gas business by good policy and organization, and where there has been arrant neglect to away with it, and to instal activity in adopting sound methods. We are not going to attempt to deal with the details of a paper which covers so much ground, because business policy, organization, and methods at the commercial end cannot be treated in less compass than Mr. Sandeman himself has occupied in discussing them. But the policy should be broad, the organization complete, and the methods enterprising. In the matter of policy there is ample guidance; but every gas undertaking cannot hope to do all that Croydon does. And there is no need to attempt to follow slavishly even the best example in this respect; for the brains and the local experience should suggest how to fashion something particularly appropriate to individual circumstances. In organization on the other hand, there is good reason for not relying exclusively upon one's own resources, inclinations, or views as to fitness. There is room here for consultation with the expert; and the British Commercial Association can, as will be seen from Mr. Goodenough's remarks, render most valuable aid in this matter.

A vital point in both policy and organization is one that is emphasized by Mr. Sandeman, and by all who have made a critical study of this matter of modern gas trading. It is that, as far as possible, every undertaking capable of running a separate department for the gas business should have one, and place it under the charge of a competent man. And competency is not covered by commercial keenness and organizing ability; it means those traits combined with a thorough training in the technology of gas utilization. There are many men who are sound from the commercial point of view, but who are not specialists in the scientific application of gas; and this is where the gas industry is at a large disadvantage in competition compared with the electricity industry. We have the appliances, and therms are becoming cheaper; and from many quarters flows the information that in competition, given the right men to direct operations, gas comes off victorious a greater number of times than electricity. But gas administrators in many towns look upon the selling of gas as being of no more importance than the retail selling of butter. If gas administrators want the gas business to have the maximum development and the maximum stability, they must recognize that gas must be applied on scientific lines to get from it the highest efficiency, that this requires special knowledge, and that the special knowledge must be the possession of the gas undertaking, for the consumer cannot be expected to have it. Moreover, the greater the efficiency realized from

the gas-consuming appliances in use, the fewer the number of complaints, and the greater the advertising power of the appliances. But the man at the top must be the right one, and must have about him a staff who have the ability to second all his efforts. He must also be a man who can give to the members of his staff honour where honour is due. Recognition is a great encouragement.

Arising from these submissions are two points that should be particularly emphasized. The first is that men of good commercial instincts and ability, having technical training, are not to be picked up just anywhere. This is neglected ground, so that the present supply of such men is not of a generous order. And yet to-day we see that men educated and trained both commercially and technically in gas utilization and application, are a pressing need at this vital end of the industry. This is a matter that must not be put off longer. The British Commercial Gas Association are working on a scheme for effectively directing the commercial and technical training of men for the sales end. We hope the result of this formulation will be highly successful, and that there will be a spirited acceptance of the scheme, and a continuous development of men under it. We want to see the ability at the trading end stand at as high a level as at the gas-making end. Vital as the former end is, it is there that in men, policy, organization, and methods, the industry shows its greatest weakness. But men there should be, and men well paid. Their responsibility is great. The measure of the recognition of this in some places is illustrated by the offer to a sales manager of a salary of £350 a year! Incapacity is not only found at the gas sales end of some undertakings; it is seen in the administrative quarters. Did it not exist there, many of the things that appear in Mr. Sandeman's paper would be such common practices that there would have been little material for him to use in treating his subject.

Pressure Intelligence at the Works.

IT was our pleasure as far back as May 18 of last year to describe a system of district pressure control that had been developed, through the ingenuity of Mr. H. C. Widlake, with the encouragement of his chief, Mr. P. S. Hoyte, at the Plymouth Gas-Works. It will be remembered that the arrangement functions electrically, and that it transmits intelligence to the works or any other desired point as to the pressure conditions in any given district, which intelligence synchronizes with the demand variations in the area concerned, though it may be situated at some considerable distance away. One does not need to expatiate on the economical and efficiency advantages of an exact mirroring at the works of what is happening in respect of pressure in a far part of the area. They are abundantly obvious, because they are real, and not assumptions. The Plymouth and the Mitcham gas-works are probably the only two in the country that can claim invention of this particular order. Such synchronous transmission of distant pressure conditions is an advance of no mean order, when contrasted with the crude informative methods that have obtained hitherto, and which are usually much belated, and largely depend upon the human element. The paper which Mr. P. S. Hoyte read last week before the Southern Association of Gas Engineers and Managers describing the system, its performances, and advantages, carries with it an intimation of continued good experience and satisfaction. This fact alone will encourage more consideration of the system by gas engineers, who are beginning to realize that pressure efficiency has now to be guarded and maintained by any and every reasonable means in all parts of the supply area, in view of the stipulations as to pressure under which the industry has now to work through the enactment in the Gas Regulation Act. One of the first things over which some men stumble when means of promoting and sustaining efficiency are put forward is the cost. What is going to be the cost, they ask. They rarely say, "What are going to be the advantages, and are these worth the cost"? In this case there is the cost of the instrument, its installation and maintenance; and the G.P.O. has to have a picking in respect of a loop-line leased at an annual rental. *Per contra* Mr. Hoyte mentions in his paper seven points of advantage, and he describes these as "some few" of them. If gas engineers considering the question of making more perfect their pressure-intelligence department will get these advantages well in mind, we venture to think the question of cost will shrink considerably in importance.

Private Bills for Next Session.

PRIVATE Bills are not going to claim much attention from Parliament next session. The total of the notices in all classes is small. Those who have to seek legislative sanction are patently playing a waiting game. They are looking for still cheaper money, materials, and labour. At the moment, there is too much uncertainty abroad, attributable in part to labour itself. Prices have been falling the last few weeks; but not in time for final and definite preparations being made for the presentation of schemes to Parliament. Those that were well advanced have either had little encouragement to move further forward, or there has been an attempt to push schemes under the Government plans for relieving unemployment, which carry with them some financial benefit to the promoters.

As to the notices for Gas Bills, it is not surprising there are only a few, and the same applies to electricity. So much can be done now through the Board of Trade in securing revision and extension of gas powers, that there is little now that a gas undertaking requires for which it need apply to Parliament; and the electrical authorities can get all they desire from the Electricity Commissioners. The notices of local authorities for General Powers Bills contain indications of a few miscellaneous gas clauses; but it is not observed that any of them are going to ask Parliament for a modification of charges, and the adoption of the heat-unit basis of trading and working. The lesson has most probably had effect that was given last session, when price revision was sought by certain authorities through Bills on the cubic feet basis, and they got in addition something they did not ask for—a provision which compels the promoters to apply within a year to the Board of Trade for authority to charge at a maximum price per therm corresponding as nearly as may be to the price authorized by their new Act, without any further addition in respect of increases in the cost of production and supply of gas which have occurred since June 30, 1914. In our opinion, it would be much better if Parliament left adjudication on these matters entirely to the Board of Trade, who have the necessary machinery for making determination on an equitable basis. This would be better than making two bites at the one thing.

It is seen that the Sheffield Company propose to substitute basic prices and basic rates of dividend for the existing maximum or other prices and maximum or other rates of dividend. The Windsor Gas Company are also proceeding by Bill to secure transfer to the heat-unit basis, and to provide for standard or basic rates of dividend. The profit division and minimum dividend plan of the South Metropolitan Gas Company is growing in favour, and small wonder after the experiences of the last few years. But the basic price and dividend method can be obtained just as well under section 10 of the Gas Regulation Act as by Special Act of Parliament. It is also remarked that the Stretford District Council, in combination with a number of neighbours, are taking advantage of the clause in the Manchester Corporation Act, which empowers them to promote a Bill next session for a Joint Board to take over from Manchester the Stretford undertaking, and this without resistance from the Corporation, beyond an appearance to protect their own interests. It seems that the long-drawn-out discussion as to Stoke-on-Trent acquiring the Potteries station of the British Gas Light Company is now to be referred to Parliament—at any rate, that is the prospect held out by one of the notices. Beyond these matters the notices do not suggest the promise of anything particularly attractive in the gas line being submitted direct to Parliament.

Coal Price Reductions.

A GREAT deal of effort is being expended at the present time to show that it is impossible for the coalowners to make any immediate further reductions in the price of coal. It is admitted that, when the pithead prices of coal are examined over the past twelve months, they do exhibit considerable reductions. The fact is evidence of a potential ability to reduce, particularly when one considers all the conditions which might have been plausibly brought forward as excuses for not being in a position to lower charges. Now when pithead prices are compared with those obtaining in 1913-14, and the effects upon industrial prosperity are scrutinized, then consumers long for more concession, and urge it as imperative. But the spokesmen for the coalowners say that this is impossible. The spirit is willing, but the circumstances are inflexibly obstructive. They assert they

have done their best. They realize that dear fuel is one among the causes of our industrial depression, and a drag on its recovery. But one of their authorities points to the fact that the average of pithead prices has fallen by 13s. 6d. per ton in the twelve months; and considerably more than that for certain sorts and in certain areas. Picking out some of the higher priced coal, the figures of January and of the present time show considerably more than 13s. 6d. reduction. But there are gas undertakings that can point to various brands which they purchase that have not receded in price more than 5s. to 6s. per ton, while other kinds in other districts farther removed from those concerns have gone down much more. As a matter of fact, there is considerable price variation evident, comparing district with district and quality with quality.

However, we are afraid, with coal standing at the present high prices compared with seven-and-a-half years ago, it will have to be accepted that there can be no immediate further reduction of any moment, and that subsequent reductions will be made very gradually—chiefly by inducing the men employed in the mines to increase their production. In assisting hope to materialize, output is very important—not only to the consumer, but to the coal industry. There is at present a large amount of unemployment and short-time working at the mines; but during the week ending Nov. 19, the output was 4,646,300 tons. We have seen a worse output with more men at work; but still it does not compare well in quantity—true with more men operating—with the week ending Nov. 20 last year, when the output was 5,210,700 tons. But the output, using the nearest figures available for computation, was better per man by 0·1 ton in the week ending Nov. 19 last, which means an improvement, relative to the number of men employed, of about 105,000 tons for the week. Better production per man is very essential to price reduction. But there are other conditions which will prevent any rapid progress in further recessions of price. The permanent part of miners' wages has been increased; and they have now a seven hours' day, compared with eight hours before the war. A "Miner," writing in the "Iron and Coal Trades Review," points out that this reduction of hours took one hour from the productive part of a miner's working day, leaving the time spent in travelling and in the various delays just the same as it was previous to the alteration of hours. It was not, therefore, merely a reduction of one-eighth of the former shifts, but it actually reduced the miner's productive time by about one-sixth. Further, the cost per ton of raising miners' coal has advanced just as much as the cost of raising the coal sold to the general public and industry; and this additional expense of getting the miners' coal has to be borne in the charges made to the ordinary consumers. All the other items comprising the total cost of production have mounted up; and these have to be borne by the lower production. Higher rates and taxes apply to collieries as to other people. Regarding transport, in every particular this has risen in cost from colliery to consumers' door or store. The best ways of greater price reduction then are through higher output and lower transport rates. The higher output would spread the other additional costs over a larger tonnage; and this would have some small effect in further easing prices.

On the whole, then, it cannot be expected that there will be any sudden "landslide" in prices. Reduction will be gradual. We may meantime get increased value for money, by the use of the fork instead of the shovel for tub-filling. The change-over is being gradually made. The resistance is great; but the miners, advised by their unions, are looking at the matter with better grace. The unions do not want to have superimposed on their other troubles any strikes over this question, upon which many owners are showing stiff backs. And rightly so.

Gas-Fires in Hotels and Boarding-Houses.

The proprietors of hotels and boarding-houses are feeling the pressure of the inquiries of intending visitors as to whether there are gas-fires in the bedrooms. At Bournemouth the proprietor of one hotel states that over 50 p.ct. of the letters he receives ask the question. This is good business, because it shows that to maintain the business of hotels and boarding-houses during a great part of the year, they must be modernized (if they have not already been so treated) by having gas-fires in the bedrooms. Further, it emphasizes how popular the gas-fire has become; and as an advertisement for gas heating, the friendly gas-fire in the bedroom away from home ranks well. With these gas-fires slot meters are used; the meters being let by the gas suppliers on the rental basis. The proprietor collects the money, and only pays for gas as registered by the primary meter. The remarks of Mr. P. G. G. Moon at the Southern Association meeting, as reported to-day, will be found interesting in this connection, as well as Mr. Goodenough's subsequent statement as to the Hotel Belgravia, where some 214 gas-fires have been fixed. Mr. Moon's analysis disclosing the proportions in which recently built houses in Bournemouth have been equipped by gas and electricity will be pleasant reading—not to our electrical friends.

The Scotsmen Win.

The Southern Association of Gas Engineers and Managers have been showing a striking preference for Scotsmen lately as Presidents. Here is a list of the occupants of the office during eight years: Mr. J. W. Auchterlonie, 1915; Mr. W. Doig Gibb, 1916; Mr. W. N. Westlake, 1917; Mr. W. B. Farquhar, 1918; Mr. Frank Livesey, 1919; Mr. C. F. Botley, 1920; Mr. J. Wesley Whimster, 1921; and (President-elect) Mr. J. M. Campbell, 1922. These are not all Scotsmen; but the Scotsmen show superiority—numerically.

Sulphate of Ammonia.

In the last two issues of the "JOURNAL," information has been given as to the proceedings of the British Sulphate of Ammonia Federation, Ltd., as well as the views of the Committee regarding the present position of the commodity, and its future prospects. Reports are now available as to the business during 1920 of the German Ammonia Sales Association of Bochum. They inform us that the transactions of the year were principally affected by the policy of the German Nitrogen Syndicate. However, there has been an increase in the output of sulphate of ammonia; the results showing an advance of 25 p.ct. over the preceding year's figures. Notwithstanding that new plants were not brought into operation, or only to such a small extent that the output did not substantially influence the total amount, the production by members of the Association totals to approximately 255,000 tons, which is roundly 50 p.ct. of the total output of sulphate in Germany. Beyond this, about 15,000 tons of ammoniacal liquor (in terms of 25 p.ct. sulphate) was produced by the members. These figures will be interesting as showing the progress of sulphate of ammonia making in Germany. The total production in Germany, it is clear, now exceeds that of the United Kingdom.

Gas and Coke.

The coal industry, from its own point of view, last week showed throughout a somewhat better tendency towards improvement; and the general view is that prices will not at present go below current levels, in view of the fact that miners' wages have now reached bottom under the agreement. The coal industry is anxiously awaiting the decision of the railway companies respecting transport rates. With regard to gas coal there is a good demand, and a greater delivery at open market prices. The abundance of supply available at such prices is keeping back deliveries under contract rates. The long fog and continued low temperature have created rather more pressure for deliveries for immediate purposes; and this applies more to the Yorkshire and the Midland coalfields than to Durham and Northumberland. Buying of the better sorts still prevails. In Northumberland and Durham, there is not much improvement in the demand for gas coal; but there are generous supplies available. In Scotland, too, purchasing is on a larger scale, but in most of the coalfields, gas-works are still pressing for lower prices. Respecting coke in those Northern counties with the best export facilities, there is good selling forward, combined with a steady demand for home use. In some other districts, home buyers appear to show resentment at the prices they are being asked to pay, and are inclined to purchase coal instead of coke.

Blue Water Gas Efficiencies.

To-day we publish the reply of Prof. Cobb and Dr. Parker to the criticisms at the recent meeting of the Institution of Gas Engineers on the sixth report of the Gas Investigation Committee dealing with blue water-gas production. One thing that needs emphasizing is that the investigation was carried out with

the object of ascertaining the efficiency of blue water-gas manufacture as representative of normal practice. Of course, one cannot expect the investigators to cover all the ground at once. They must proceed in piecemeal fashion if they are to make periodical reports upon the work done. But when they have explored the whole area and its precincts, then we hope that a review by the Committee will present the picture complete. At the same time criticism does no harm. It helps the investigators to learn what other investigators are looking for and hoping for. Prof. Cobb and Dr. Parker deal seriatim with Mr. E. G. Stewart's efficiency criticisms, and particularly interesting will be found their examination of the point as to the heat value of the re-usable material of the generator ejections. They question whether in all cases it would pay to sort-out such fuel. As to waste-heat boiler efficiencies, while favourably regarding the service of such boilers, Prof. Cobb and Dr. Parker are rather inclined to think from their theoretical calculations that Mr. Stewart is too optimistic. However, they have now in hand practical research on the point. We fancy Mr. Stewart will hardly be inclined to leave the matter where it stands.

Cleaner Fogs.

We have lately in London experienced a fog heavier and of longer duration than there has been for some time past. It has not been a pleasant experience. But there is one thing noticeable; and it is that in all newspaper references we have seen, there is the admission that the fog was cleaner than its filthy predecessors of some years ago. It is a good gain to have this public admission; and it is testimony that gas is doing its share in improving the worst conditions of outdoor life at this season of the year. The public should be made to realize that the more this sort of thing goes on, the better for health and pocket. Dr. J. S. Owens cannot assess the money value of the injury done to health by dirt in fogs; but he has made some approximate calculations which show that fogs cost the "man in the street" an average of £1·5 a year. He says that in London, where the soot-fall for the year ending March 31, 1920, averaged 344 tons to the square mile, the total estimated cost of smoke-fogs is £8,750,000 annually. How is it incurred? There are many causes. Take, for instance, the following approximate figures for household losses: Damage to painting, £293,000; damage to metal work, £880,000; damage to curtains, £316,000; cleaning and renewing wallpaper, £485,000; artificial lighting, £74,000. As to large stores and shops, Dr. Owens calculates the losses as follows: Merchandise spoiled, £1,522,000; precautions against entry of soot and fog, £416,000; cleaning, £693,000; lighting, £600,000. In public buildings the expenditure is about £154,000. How these figures are even approximately arrived at, we do not know; but, as the use of gas heating extends, probably they will need revision.

Developments in Heavy-Oil Engines.—In a paper on "Some Recent Developments in Mechanical-Injection Oil-Engines using Heavy Oils," which he read before the Diesel Engine Users' Association, Mr. Oswald Wans dealt with some of the outstanding developments of two and four cycle mechanical injection engines which had been instrumental in rendering them efficient and reliable. In connection with two-cycle engines, reference was made to the light-load running gear adopted by Vickers-Petters, Ltd., by means of which a portion of the fuel is injected well in advance of the main charge, thus giving the pilot charge time to vaporize before the entry of the main charge. Fuel consumptions as low as about 0·55 lb. per B.H.P. hour—equivalent to a brake thermal efficiency of 25 p.ct.—were mentioned as having been obtained with a fuel of about 0·9 specific gravity and 18,300 B.Th.U. per pound.

Cleveland Technical Institute "Bulletin."—The first number has been published of the "Bulletin" of the Cleveland Technical Institute, of Middlesbrough, compiled and edited by the Director and Secretary, Mr. Edward L. Johnson. The original idea of the Institute was that it should be the home of all technical workers in the great and increasingly important manufacturing centre in which it is situated; and it was also intended to become a centre from which, month by month, information relating to all developments in the outside world should be disseminated. Hence the establishment of a Technical Intelligence Service, and now of the "Bulletin," which contains brief abstracts of articles, papers, &c., published in the technical journals which are likely to be of interest to any local industry. The abstracts are printed on one side of the paper only, classified, and so arranged that any one may be cut out and pasted upon an index card for filing. The "JOURNAL" is included among the large number of periodicals which are regularly received by the Institute.

OBITUARY.

The death has occurred at Tamworth of Dr. ALFRED MILWARD SCULTHORPE, J.P., who had been a Director of the Tamworth Gas Light and Coke Company since September, 1892, and Chairman from May, 1916. He was 75 years of age, and had occupied the mayoral chair five times. Dr. Sculthorpe was also a Director of the Fazeley Gas Company, Ltd.

PERSONAL.

Last Thursday, at St. Paul's Church, Knightsbridge, the marriage was solemnized of NAOMI WINIFRED GRAHAM, only daughter of Maurice Graham, C.B.E., and Mrs. Graham, to ASHLEY ARGENTI COWAN, son of the late Ashley Cowan and Mrs. Cowan, of "Wildwoods," near Enfield. A reception was held afterwards at No. 20, Prince of Wales Terrace.

Mr. ARTHUR BENTLEY, late Distribution Superintendent at the Stafford Gas-Works, has been presented with a handsome silver rose bowl by the employees, on the occasion of his leaving to go into business on his own account. Mr. Bentley has been connected with the Stafford Gas-Works for about 34 years, and for 19 years was Distribution Superintendent.

An event of some interest to the gas profession was celebrated at St. Gabriel's Church, Cricklewood, London, on Wednesday last, when Mr. WILLIAM BENNETT, the Engineer and Manager of the Corporation Gas-Works, Mossley, near Manchester, was married to Miss Miriam Vera Cromwell-Warden, of No. 18, Mapesbury Court, Shoot-up-Hill, Brondesbury. Mr. James Jamieson, Assistant Manager at Edinburgh, performed the duties of best man. The only other representative connected with the gas profession present was Mr. David Marwick, Works Superintendent, Hilsea Works, Portsmouth.

At a recent private dinner gathering of the staff of the Bradford Corporation Gas Department, a handsome illuminated address, in a golden frame, the dominant note of whose design is its dignified simplicity, was presented to Mr. CHARLES WOOD, the Engineer and General Manager, to mark the completion of 40 years' service in the department and 24 years as Engineer and Manager. A very beautiful silver dish was also handed to Mr. Wood as a gift for Mrs. Wood. The illuminated address reads as follows: "We, the official staff of the Bradford Corporation Gas Department, hereby express to you our heartiest congratulations upon the completion of your 40 years' continuous service and 24 years' as Chief Engineer and Manager. The success of the department during this time has been due to the conspicuous ability, tact, and judgment with which you have conducted its affairs. We also desire to record the affectionate regard and esteem in which you are held by those who serve under you. The kindly consideration that you have invariably shown has won our respect and confidence, and created many beautiful and precious memories. Our best wishes are also for the welfare of your wife and family, all of whom have a warm place in our hearts. We hope that this address will be a memento of past happy days and an augury of pleasant associations in the years that are to come. Signed, on behalf of the official staff, Ernest J. Sutcliffe, John Whitaker, Percy Ward. Nov. 25, 1921." Mr. Sutcliffe is Deputy Engineer and Manager, and Messrs. Whitaker and Ward are departmental heads.

ELECTRICITY SUPPLY MEMORANDA.

THERE has again been much talk recently regarding domestic electrification. The Electrical Correspondent of "The Times Engineering Supplement" has now got the fever; and he has written an article headed "Opportunities for Advance." After reading it, one is deeply impressed by the opportunities suggested for complication. We are told in the contribution that it is remarkable how all through its commercial history, electricity has been impeded in its development by obstacles that are of an artificial character, far more than by any scientific and technical problems of its own. There have, it is alleged, been many more such problems of political and economic interest than of electrical interest. The whole article taken by itself is a flat contradiction of these assertions. First of all, there is mention of the arithmetical entanglements usually disguised under the general heading of "Methods of Charging." Why have there been all these "electrical entanglements?" These developments have arisen from the difficulties imposed by the high cost of current, and the endeavour to obscure by artificial and specious means the actual cost per unit. Then we are told that during the past three years there has been "spirited enterprise" on the part of the manufacturers of various domestic appliances and apparatus. We have not seen anything of this that denotes anything more than changes in design—nothing that in these three years has improved efficiency and reliability. Troubles with domestic electrical appliances still go on with "spirited" persistence. A point is made of the Glasgow Corporation having bought a couple of hundred electric cookers, and, at a rental of 10s. a

Domestic Opportunities.

quarter, having disposed of them all. There is nothing wonderful about this. The employees of the Electricity Department alone, we should imagine, could absorb that number. Glasgow, too, is a large place; and in its population there are, no doubt, considerably more than a couple of hundred people who would patronize anything on offer that is novel. But the first fuse that goes in the middle of the cooking will knock the love of this particular novelty on the head, unless there is a gas-cooker still in position which becomes at first a stand-by, and then is soon restored to the primary position on account of its greater and speedier capabilities. The article goes on to refer to the savings that can be effected in house construction by the utilization of electric appliances, and says it is "understood" that the saving in the cost of construction is sufficient to pay for the whole of the electric wiring and apparatus. This depends on the wiring and the apparatus, because wiring and apparatus may vary in quality and appearance very largely. If the saving on construction will pay for the whole of the wiring and apparatus, then it would pay for the whole of the gas piping and gas apparatus, and leave something over. Nothing is said by the writer as to the running costs to the consumers on the new order of prices, which must continue to be high, seeing that, although the price of coal has come down, fuel is actually one of the minor parts in the total of electricity costs at the seats of utilization.

Complicated Use of Current.

The points made are regarded as the first opportunities for advance. But there is another which is spoken of as being very "attractive" business, but which we should describe not as an opportunity for advance, but as an opportunity for complication. It is that remarkable scheme of heating water at night time (with all its radiation losses) for use during the day. The apparatus designed to accomplish this is a tank containing usually 10 to 15 gallons of water, fitted with electric elements taking from ¼ to ¾ unit per hour, and requiring from ten to twelve hours for raising the temperature of the water—to what? Let us suppose 15 gallons of water, or 150 lbs., raised to a temperature of 160°. This would require about 17,100 B.Th.U., or 5 units of electricity, at ½ unit consumption per hour; and this at 100 p.ct. efficiency, and no heat losses!—neither of which conditions would obtain. Would the 5 units be taken off the lighting circuit or be separately metered, or charged out at 1d. or 1½d. per unit, *plus* the proportion of a primary fixed charge? We rather think the consumer would desire to heat water promptly and tap it just as required, as can be done with a gas-heated geyser without continuous thermal loss over ten to twelve hours. The correspondent points out that it is possible to contrive that the switching-on of lamps, radiators, or cooking appliances may automatically switch-off the current supplied for the hot-water tank, so that the heated store of water would then begin to lose more of the heat for which there had to be payment. It is a nice scheme for simpletons. The ideal arrangement, it is pointed out, is that a house should purchase a 24-hour supply of electricity, and should apportion it either by timing or switching, so that there is at no moment a heavy and embarrassing demand upon the central station. Consumers do not like restrictions in the use of commodities for which they pay. This is all rather amusing to those accustomed to using gas *ad lib.* as and when required. With electricity the opportunities for complication and inconvenience are great.

Voltage and Man and Lamp Life.

A writer in the "Iron and Coal Trades Review" does not seem particularly enamoured of the voltages employed in and about mines. Though mine lighting is in question, there is general interest about the points raised. It seems that the rules relating to the use of electricity for lighting mines do not contain a clause limiting the voltage. Last year there were nine electrical fatalities reported in and about mines; four being due to contact with electric light circuits, the minimum pressure of which was 220 volts, while the maximum was 250 volts. A few days since, a wireman employed at the National Refineries, Skewen, near Swansea, was electrocuted through contact with an alternating current at 250 volts. So there is doubt as to whether there is a sufficient margin of safety when applied to colliery lighting circuits. It is also submitted that the use on such voltage circuits of the most efficient forms of lamp is almost prohibitive, owing to their fragility and short life, which altogether outweigh the advantages of any increased efficiency. From considerations of man and lamp life, the writer advocates 50 to 100 volts for use in mines.

Charges Based on Floor Area.

One of those "arithmetical entanglements" to which reference is made in the opening note this week is the Dundee one, where some genius brought into use a two-part tariff—the fixed charge being based on floor area (and not on the area of the buttons on the consumer's coat), with a secondary charge of ⅞d. per unit. This glorious conception of the fitness of things it appears has not, as an alternative to the flat-rate, been so alluring as was hoped. The response has not been large. What is the reason for this? No reason seems to have been assigned as to why existing consumers have not made better response; but the "Electrical Review" tells us that, so far as prospective consumers are concerned, the disappointing response is thought to be due to the high cost of installation. To stimulate matters, the Corporation Electricity Department have fitted-up a seven-roomed house, including the usual scullery, kitchen, and bathroom, in order to demonstrate the utility of electricity. The house has been equipped on the cheapest lines—not in the manner which electricity at one time claimed as essential to its notions of high standard work, even though this high standard did not give assurance against disaster. Our contemporary says that Major H. Richardson, the Engineer, explaining the method of wiring adopted (a simple surface one), points out that expensive ceiling fittings or electroliers are unnecessary, and that a complete installation for lighting, heating, and cooking can be carried out quickly in houses at present using other methods without a great deal of preliminary work, and much more cheaply than any other system. It is also claimed that the present elaborate system of switching and fittings is done away with. Mr. Richardson also states that the new system obviates a great deal of damage which was caused through lights hanging from the ceiling; and the new wiring, while practically undiscernible, has a large current-carrying capacity, and fully provides for all the uses that electricity can be put to in the home. We may see later how this all works out. But at the moment the primary charge on floor area has apparently not caught on.

Salesmanship Conferences.

The first of the series of conferences organized by the British Electrical Development Association for the discussion of the various phases of electrical salesmanship has been held, and reports have been published. These conferences are quite informal; but it is believed that they will have a vastly stimulating and educative effect among contractors and salesmen interested in the supply of both electrical energy and appliances. The whole object of the conferences is to bring together the persons engaged in these matters, so as to secure a pooling of their knowledge and experience, with the view to concentrating attention on the best methods of popularizing the use of electricity. At the first conference a paper was read by Mr. E. H. Freeman on "Salesmanship in Wiring and Installation Work." From what he says, the first cost of installation is the greatest impediment to the progress of electric lighting; but canvassers should be able to meet all such objections. Cost of installation is, however, a very material and a very adamant matter of objection. This is what the canvasser finds; and what he really wants to know is how he can make £50 or £60 and very much more appear in the eyes of the consumer to be only equal to (say) £20 or £25, or less. Mr. Freeman stated that, while he acknowledged the difficulty, electric lighting installations would not involve any more than an additional expenditure of 2 to 3 p.ct. on the cost of the house. This depends on the house, and the class of installation put in. When one comes to talk of 30s. to 40s. per point in a house the constructing cost of which was (say) £800, then 2 to 3 p.ct. on the cost is an absurd computation. Then we had the grey-with-age argument trotted-out as to switching promoting economy. If there is any electrical salesman who has not used this argument, then he has forsaken the traditional ways, and ought to be promptly kicked out of his job. But, unfortunately, familiarity breeds contempt; and, after a bit, the switch becomes just as much neglected as it was played with in the early days of its installation. Then the author advised that use should be made of the fact that other electrical things could be employed besides lights on the same circuit, which is a good method of satisfying the consumer eventually that his lighting account is an abominably heavy one. There was wisdom in one thing the author had to say—that it was a great mistake to suggest too low a cost for installation. He also assured his hearers that the objection to running cost with electricity was a most futile one, as it was quite easy to get examples of gas and electric accounts which would convince the prospective consumer. The reduced fire risk of electricity was also a point that the shrewd canvasser should make; but we hope that those salesmen who were present listened to the voice of the contractor who called attention to the fact that a consumer who had an estimate from one contractor would often go to another and obtain a price for doing the job at a cheaper rate—this probably resulting in the house being wired with flexible cord, and introducing a risk of fire. The same candid friend stated that some insurance companies pass installations which are really dangerous. This is not quite the sort of talk the Electrical Development Association desired. The advice was also given by another speaker that, at the outset, a canvasser should not ask a new consumer to have too much installed—it being much better to let the custom grow. We are afraid the first conference did not do much to promote greater efficiency among electrical salesmen.

Electrical Gasification of Coal.

In October of last year, the "JOURNAL" referred to the subject of the gasification of coal by electrical means; and on Nov. 3, allusion was made to the fact that Mr. J. Mogford had taken out provisional protection for a system of doing this. As we pointed out at the time, it would be a strange thing if a heating agent generated at the low thermal efficiency of electricity was utilized for producing a heating agent which, in present circumstances, is accomplished at an efficiency which exceeds by a considerable amount the very height of the ambitions and expectations of the most sanguine electrical engineers. It is understood that the Norwegian Association of

Engineers have had before them a report concerning experiments made by Mr. Edwin, of the A.S. Norsk Staal, in the direction of the electrical gasification of coal. It is stated that he has solved the problem, that his method would permit of the coal consumption at an ironworks being reduced to 14 to 15 p.ct. of what is reckoned with blast-furnace working, and that the gas could be transmitted over long distances equally as cheaply as electrical energy. This is all a bit vague. Perhaps some day we shall learn more about it.

THIRD ANNUAL CONVENTION OF THE AMERICAN GAS ASSOCIATION.

[FROM AN AMERICAN CORRESPONDENT.]

THE Third Annual Convention and Exhibition of the American Gas Association was held in Chicago from Nov. 7 to 12. It was attended by twelve hundred members and guests, many of whom had come more than a thousand miles from east, south, and west to testify to the solidarity of the gas industry, and to share in the mutual giving and receiving of information as to the past and inspiration as to the future.

Following its now well-established custom, the Association met as one body in three morning sessions, but divided into sectional meetings in the afternoons. On one day, four of these meetings were being held simultaneously. It has taken nearly a decade to prove conclusively the value of sectional meetings; but the task is now accomplished, and the American Gas Association is an ideal combination of a single representative of the industry to the outside world, which contains within itself provisions for the development of all its component parts. Due to the physical impossibility of one individual attending each session and to the limitations of "JOURNAL" space, no attempt will be made to describe the Convention's doings as a whole; this account being devoted in the main to matters of general interest to the gas men of any country.

It was an inspiring sight that greeted the President, Mr. Charles A. Munroe, of Chicago, as he took the chair for the opening session. Eight hundred faced him where he sat on the platform flanked on either side by the Presidents of many of the fifteen State Gas Associations affiliated with the national body; and the meeting was opened by the introduction of each of these Presidents in turn—a very fitting recognition of the affiliation tie. The Secretary-Manager called attention to the steady growth in membership beyond all original anticipation, and that promises soon to leave few, if any, companies outside the Association. He spoke of co-operation with the National Electric Light Association and the American Electric Railway Association, of gas statistics for 1920, gathered by his staff, and how, in this and many other ways, the Association was increasing in its usefulness to its members as an information and service bureau. What makes this usefulness possible was shown by the Treasurer's report, with its principal item of expense, $72,000 for salaries. On the income side, besides a balance in hand of $73,000, there stood out $15,000 from individual members' dues and $115,000 from company members. This last item tells the whole story of the Association's success. With its organization, the gas industry for the first time in this country gave its sole national representation adequate financial support. For years, in a mistaken idea that company membership would have harmful results, our leading gas engineers clung to individual memberships only, with such resultant meagreness of income that the functioning of the Association was practically limited to the few yearly meeting days.

The President in his address urged more complete organization of the industry, to co-ordinate all activities in one great purpose of fulfilling to the utmost our obligations to the public. He pointed out that we are now of one opinion as to the character of the price structure for gas. He referred to the almost complete elimination of the candle-power standard and to the economic necessity for calorific values based on available raw materials and manufacturing processes. This portion of his thought-provoking talk was supplemented by the report of Mr. A. I. Phillips, one of the Association's service engineers, upon his recent investigation in England of the conditions, past and present, leading up to the Gas Regulation Act and the therm. Nothing of this can be news to your readers; but it is most pleasing here to record his enthusiastic testimony as to the courtesy and co-operation extended to him in Britain. Returning to the President's remarks he spoke of the importance of continuing the custom, fast becoming country-wide, of selling securities to employees and gas consumers. The community of interest thus established will tend to prevent the unfair treatment of public utilities all too common in recent years. In closing, he referred to the increasing attention being paid by our technical schools to gas engineers, and to the value of employee representation in company management. After the President's address, the Association accepted the report of the Nominating Committee for the President, Vice-President, and Treasurer. Additional officers are elected by other methods.

The closing address of the first session was "Merchandising Problems in the Gas Industry," by Mr. C. C. Parlin, the Manager of a division of commercial research conducted by the publishers of three national magazines with a combined circulation of over four million copies weekly. His comparisons of merchandising methods pursued by various lines of industry, with especial reference to possible improvements by gas companies, were received with great interest and will prove helpful to many of his hearers.

The second general session (Thursday morning) opened with the reports of General Committees. The Accident Prevention Committee referred to a pending joint investigation by the gas and medical professions into the best methods of resuscitation from gas asphyxiation. The Committee on Standard Gas Appliance Specifications presented some revisions and announced forthcoming specifications for flexible tubing. A Committee appointed to consider other methods of charging for gas than by thousand cubic feet, said it was advisable to gather further data, and especially to observe British experience with the therm before reaching any conclusion. The marketing of gas securities locally among employees and consumers was described by several speakers, one of whom has thus sold about $30,000,000 worth in less than three years.

Among the interesting items of the Friday morning session were the greetings and good wishes by wire from the British Institution of Gas Engineers and the Canadian Gas Association (to which suitable acknowledgments were made), and the election to honorary membership of the Presidents of the British Institution and of the Société Technique. The address of the morning was "The Gas Industry's Biggest Task," by Samuel Insull (born in England, but now of Chicago), who controls the largest aggregations of gas, electric light, and electric railway companies in the world. To his mind this biggest task was to square the rights of the public with those of the stockholders, and to convince the former of fair treatment. He considered the gas companies were most to blame for the uneconomic form of gas prices in common use. He demanded a decided improvement in engineering methods, and called for a more radical scrapping of old ideas as well as processes. The report of the Committee on Customers' Service came as a fitting sequel to Mr. Insull's remarks, because it was a very complete and timely summary of the many elements needed to ensure good gas service and thereby to make every consumer a friend of the company.

In the Technical Section meetings, "What Goes on in a Water-Gas Machine" described some experience with a wet-bulb thermometer to indicate, with no appreciable lag, the rate of steam decomposition during each run. The discussion developed some scepticism as to the degree of accuracy obtained. The Committee on the Complete Gasification of Coal described various processes for more or less complete gasification. Our interest in this subject is, perforce, at present rather academic, because calorific value requirements are all in excess of 500 B.Th.U. To the discussion, Mr. Fred. J. West, of Manchester, lent a note of internationalism.

"The Seaboard Liquid Process for Gas Purification" is a recent and successful liquid process, now in use on a large scale. The paper was read in a special session of the Chemical Division of the Technical Section, being one of several subjects of special interest to gas chemists. In an adjoining room, other members of the section were listening to papers on distribution matters, among the latter being recent installations of 16-in. and 20-in. mains, laid with cement joints made in the newly designed "No. 2" or "B" bell, from which there are great expectations. When it is stated that some of our best distribution engineers expect as tight joints with cement in the No. 2 bell as with lead wool in an ordinary bell, and that on current work a 20-in. joint of lead wool costs $7·74 and of cement $2·02, the economic value of the new joint may be realized. Another distribution subject was "Utilization of Compressed Air for Clearing Gas-Piping," which described results and economies from the use of air or gas compressed to 1200 lbs. for blowing stoppages from house piping or services. There is a definite field in gas company work in this country for these high-pressure tanks as a substitute for hand force-pumps. The pressure actually used is probably less than 100 lbs. The advantage of the greater compression in the tanks lies in economy of transportation and use.

There were the customary entertainment features—the President's reception, followed by dancing on Wednesday evening; a banquet and dancing on Thursday evening; and golf privileges for every one. The ladies participated in the reception and banquet, and in addition were given a luncheon. With national prohibition, the mingling of the sexes at our banquets came as a logical and now-proven happy sequence. At the banquet the speakers, in addition to the President and President-Elect of the Association, were the Presidents of the other national public utility associations—a striking example of the closeness of the tie now binding all our public utilities. As usual, these intervals of play were greatly enjoyed. But more than ever the note of the Convention was work; and in session after session the emphasis was on service—to the industry, the employee, the public. It was fitting, indeed, that in this Convention and just at the close of Mr. Insull's exhortation to still greater service, should have come the two-minute period of silent prayer observed by the American nation from ocean to ocean during the burial of the Unknown Soldier, whose memory many of us hope will finally lead our country back to the paths of complete international co-operation, from which at present we have seemed to wander. This account may well end with the men of our industry, leaders and rank-and-file, standing with bowed heads and facing East to the symbol of past destruction and future hope.

BLUE WATER-GAS PRODUCTION.

By Prof. J. W. COBB, C.B.E., B.Sc., and Dr. A. PARKER.

Reply to the Discussion at the Meeting of the Institution of Gas Engineers, on the Sixth Report of the Gas Investigation Committee.

THE following reply to the discussion on the Sixth Report of the Gas Investigation Committee of the Institution of Gas Engineers has been submitted on behalf of the Committee by Prof. Cobb and Dr. Parker. The Committee's report was published in the "JOURNAL" for June 15 last, p. 619, and June 22, p. 672, and the full report of the discussion thereon appeared in the issue for Oct. 19, pp. 202-204.

We should like, in the first place, to thank Sir Dugald Clerk for emphasizing the fact that the report, and the balances contained therein, show where heat losses occur in the manufacture of blue water gas according to normal practice and the magnitude of such losses, so indicating points of attack for gas engineers and others who set out to improve the efficiency of the process.

In reply to criticisms by Mr. Stewart, it must be pointed out in the first place that the work of the Committee was carried out with the object of ascertaining an efficiency of manufacture of blue water gas representative of normal practice. As a result of the tests at the Adderley Street Works of the Birmingham Gas Department, it is believed that this object has been attained. It is also considered that the methods of calculation adopted in the report are such that the results are neither improved nor depreciated, though we have preferred somewhat conservative treatment. The figures given indicate that, under the particular conditions of operation, 46 p.ct. of the potential heat value of the total fuel used in the generator, and for raising steam and driving the blower, was recovered as potential heat in the water gas made. Without making any allowance for the fuel required for raising steam and driving the blower, the thermal efficiency was 56 p.ct. The possibilities of increasing the efficiency of 46 p.ct. by the installation of a waste-heat boiler or by changes in the method of operation of the plant were also discussed in the report, and from the calculations which were made it seems highly probable that a waste-heat boiler would raise at least sufficient steam for the generator and turbine-blower; but these calculations were based on certain assumptions and not on tests, for reasons with which we propose to deal in this contribution.

FUEL CONSUMPTION—GROSS OR NET?

The first point raised by Mr. Stewart is that an allowance ought to have been made for the potential heat value of the material removed from the generator during clinkering periods, thereby increasing the calculated efficiency, without taking into account the steam used, from 56 to 60 p.ct. Such an allowance would have been difficult to justify, because the whole of the material removed from the generator was actually rejected as not worth the labour of packing. The recovery of the fuel value of the clinker, ashes, and dust appears at present to be a doubtful commercial proposition. The analyses given in Table IV. of the report show that the ashes contained 37 p.ct. of carbon (only part of which would have been separated in usable form by picking in any case), while the clinker contained only 6 p.ct. carbon; and though the dust collected in the catch-pocket contained 78·5 p.ct. of carbon, the total quantity was small, and it was obtained in an inconvenient form.

It is a common practice to reject the whole of the material taken out of the generator during clinkering periods, although in many instances a proportion of the heat value is recovered, either by means of ash-washing plants or by hand-sorting. The success of an ash-washing plant is dependent largely on the differences in gravity of the ashes and small clinker and of the coke to be recovered; and although the process is no doubt profitable under certain conditions, it is not profitable under others. We agree that if a satisfactory process of recovery under the particular circumstances is available, it certainly ought to be adopted. When fuel is recovered, allowances should be made in calculations of efficiencies; but even in such case it is not likely that ash-washing or hand-sorting saves more than a comparatively small proportion of the fuel value of the material removed from the generator. Further power is required for the operation of an ash-washer; and this should be taken into account. Thus it is clear that, even with an ash-washing plant working in conjunction with the blue water-gas plant at Adderley Street, the thermal efficiency would not have been increased by a figure nearly so high as the 4 p.ct. suggested.

In the case of the tests carried out at Uddingston, the weight of the fuel used in the producer was corrected for the breeze recovered by riddling, since this breeze (which contained 22 p.ct. of ash) was used for the boilers. No correction was made for the potential heat of the waste ashes, which contained 72 p.ct. of ash. Perhaps it should be pointed out that clinkering in the ordinary sense was rarely necessary at Uddingston; the operation carried out every four hours merely consisting of cleaning and "pricking-up" the fire.

The calculations in the two reports are therefore consistent in method, in that allowances were made only for the material recovered and used, with the result that the figures obtained represent actual efficiencies. It is, however, advisable to bear in mind that with the blue water-gas plant some portion of the loss of potential heat in the ash and clinker is at times recoverable with profit.

WASTE-HEAT BOILERS.

Mr. Stewart's second point referred to the figures given in the sixth report for the amounts of steam which could probably have been raised by means of a waste-heat boiler. In this connection it must again be emphasized that the figures given in this estimate were not derived from actual tests, but were the results of calculations which could only hold for the particular amounts, temperatures, and compositions of "blow" and "run" gases obtained under the conditions of the tests described in the report. In making these calculations, it was assumed that (1) the effluent water gas and undecomposed steam left the waste heat boiler at 300° C.; (2) the potential heat of the blow gas was converted into sensible heat by combustion with air in such proportion that the waste gases contained 3 p.ct. of oxygen; and (3) the waste gases left the boiler at 300° C. On these three assumptions, 63 p.ct. of the total of the sensible heat of the "blow" and "run" gases and undecomposed steam and of the potential heat of the blow gas would have been available for the recovery in a waste-heat boiler. But this 63 p.ct. is the maximum theoretically possible, since no allowances have been made for (*a*) losses by radiation, convection, &c., from the blow-gas, combustion chamber, and waste-heat boiler, (*b*) losses in the distribution of the steam, (*c*) losses due to "blowing" the boiler during each clinkering period, and (*d*) losses due to periodic shutting-down for the purpose of cleaning the boiler. Without data derived from practical tests, it is impossible to decide on the amount of the allowance which should be made to cover the losses just enumerated. It was found, however, by calculation that if 70 p.ct. of the maximum theoretical figure of 63 p.ct. could be recovered, there would be sufficient steam to meet the requirement of the regenerator and turbine-blower. This figure of 70 p.ct. must not be confused with what is usually understood by the over-all thermal efficiency as obtained from tests on ordinary types of boilers; for it means only that the steam raised would be sufficient for the generator and turbine blower if 70 p.ct. of the 63 p.ct. maximum theoretically possible amount of heat, under assumptions (1), (2), and (3), were recovered—*i.e.*, if the over-all thermal efficiency of the waste-heat boiler installations were 70 p.ct. of 63 p.ct.—that is, 44 p.ct.

Mr. Stewart stated that the gases leave the waste-heat boiler at Fulham at an average temperature of 230° C. Substituting this figure for our assumed figure of 300° C. in assumptions (1) and (3), it may be calculated that the maximum theoretical thermal efficiency of the waste-heat boiler installation, working under the conditions of the tests described in the report, would be 70 p.ct. This value of 70 p.ct. could not, however, be attained in practice, owing to the losses by radiation, convection, &c., tabulated under (*a*), (*b*), (*c*), and (*d*). Mr. Stewart's overall efficiency of 70 p.ct. is therefore, in our opinion, too optimistic—70 p.ct. is a reasonable overall efficiency to take for a direct-fired boiler, but not for a waste-heat boiler, where the temperature head available is always relatively low. In a criticism of our fourth report on "Steaming in Vertical Retorts," Mr. Stewart expressed the opinion that 70 p.ct. was too high an efficiency to take, even for a direct-fired boiler.

RESULTS BY MR. E. G. STEWART.

In consideration of his paper on "Heat Conservation and Water Gas" previously presented to the London and Southern District Junior Gas Associations [see "JOURNAL," March 3, 1920, 750 *et seq.*] Mr. Stewart raised objection to a note in italics in the sixth report which states that before reliable conclusions can be drawn regarding the advantages or disadvantages resulting from waste-heat boilers in continuous vertical retort settings of blue water-gas plants, actual working tests are required.

This opinion was only expressed in the report after a survey of the literature on the subject, including a careful examination of Mr. Stewart's paper, which consists mainly of an interesting historical account of the development of the manufacture of water gas, together with theoretical considerations on which are based calculations of the efficiencies of a blue water-gas plant in four hypothetical cases approximating to possible conditions in practice. The last part of the paper included a description of the plant at Fulham and some working figures. No details appear, however, as to how the results were obtained; and there are no figures to represent the compositions or the calorific values of the fuel used. With regard to the composition of the water gas made, carbon dioxide and carbon monoxide contents only are given; and it may be concluded that in the blow gas obtained with the blue gas plant with waste-heat boiler the ratio CO_2/CO was a little greater than 60/40. Mr. Stewart gives the amount of water actually evaporated in the waste-heat boiler as 107 lbs. per 1000 c.ft. of gas made. But from the information given, it is impossible to say what were the exact conditions prevailing when this amount of water was evaporated; and the data are certainly insufficient to enable the construction of the full thermal balances given in Mr. Stewart's contribution to the discussion on the sixth report.

We adhere to the opinion that tests of a waste-heat boiler on a blue water-gas plant to be of real service must be complete, and must be carried out at the same time as complete tests on the generator and blow-gas combustion chamber, in order that the losses in each section may be determined. It is not enough to

carry out a test on the generator at one time and on the boiler installation at another, and to assume that the gas producing conditions can be repeated with sufficient approximation.

COMPARISON OF HEAT IN STEAM WITH HEAT TAKEN UP BY WASTE-HEAT BOILER FROM MR. STEWART'S RESULTS.

By combining the figures given in Mr. Stewart's original paper with those in the thermal balances included in his criticism of the sixth report, is it possible to make some estimate of the heat taken up by the waste-heat boiler for the purpose of comparison with the heat in the steam raised? It is necessary to make certain assumptions; but comparatively large errors in these assumptions would have little effect on the final results of the calculations. The method of calculation is given below, in order that it may be open to criticism or checking.

(1) Fuel for generator (gross) = 39·6 lbs. = 5·06 therms. Therefore calorific value of fuel per lb. = 12,770 B.Th.U. Assume that fuel contained 1 p.ct. hydrogen and 2 p.ct. sulphur, then, by substitution in Dulong's formula for calorific value, it is found that the generator fuel contained 83 p.ct. carbon—*i.e.*, 39·6 lbs. contained 32·9 lbs. carbon.

(2) The thermal value of the water gas made was given as 300 B.Th.U. (gross) per cubic foot. Combining this figure with the carbon dioxide and carbon monoxide contents of 4·8 p.ct. and 41 p.ct. respectively, and assuming 0·05 p.ct. hydrocarbons and 1 p.ct. methane, the following composition of water gas made may be deduced: CO_2, 4·8; CO, 41; C_nH_m, 0·05; CH_4, 1; H_2, 49·5; N_2, 3·65. The carbon content of 1000 c.ft. of gas of this composition is 14·6 lbs.

(3) Ashes, clinker, and dust, potential heat per 1000 c.ft. water gas = 0·67 therms, which is equivalent to 4·6 lbs. carbon. The figures deduced in (1), (2), and (3) enable the construction of the following carbon balance in pounds:

Fuel to generator	32·9
Water gas	14·6
Ashes, clinker, and dust	4·6
Blow gas (difference)	13·7

(4) From the above carbon balance it may be seen that the blow gas contained 13·7 lbs. carbon and the potential heat value of the blow gas per 1000 c.ft. water gas made was 0·70 therms gross (Mr. Stewart's thermal balance). Since the ratio CO_2: CO was about 60 : 40, the blow gas must have contained approximately 14·7 p.ct. CO_2 and 9·8 p.ct. CO. The conditions would be fulfilled by the production, per 1000 c.ft. of water gas, of 1780 c.ft. of blow gas of the following composition: CO_2, 14·7; CO, 9·8; H_2, 1·9; CH_4, 0·2; N_2, 73·4.

(5) Mr. Stewart states that the waste gases leaving the boiler and passing up the stack contained 18 p.ct. CO_2. The 1780 c.ft. blow gas would therefore produce 2·440 c.ft. of "burnt blow gas" which entered the boiler at 582° C. (1800° Fahr.) and left at 232° C. (450° Fahr.).

(6) From the calculation in the five previous sections and the thermal balances recently given by Mr. Stewart, it is possible to calculate the amounts of heat entering and leaving the boiler; the difference between the two figures being the maximum amount of heat which could be used in raising steam if there were no losses from the boiler by radiation, convection, &c.

Heat entering boiler:

Sensible heat, 2440 c.ft. "burnt blow gas" at 1800° Fahr.		0·88	therms.
,, ,, water in "burnt blow gas". .		0·03	,,
,, ,, 1000 c.ft. water gas (Mr. Stewart's thermal balance)		0·18	,,
,, ,, undecomposed steam (Mr. Stewart's thermal balance) .		0·10	,,
Total heat entering boiler		1·19	,,

Heat leaving boiler:

Sensible heat, 2440 c.ft. waste gas at 450° Fahr.		0·20	therms.
,, ,, 1000 c.ft. water ,, ,, ,,		0·07	,,
,, ,, undecomposed steam ,, ,,		0·07	,,
Toral heat leaving boiler		0·34	,,

The maximum amount of heat which could have been taken up by the boiler, calculated in this way, is therefore 1·19 *minus* 0·34—*i.e.*, 0·85 therms—which would raise only 78·6 lbs. of steam at 100 lbs. pressure from water at 140° Fahr. as a maximum, without any allowance for losses from the boiler by radiation, convection, &c.

But Mr. Stewart gives 90 lbs. in his criticism of the report and 107 lbs. in his original paper as steam actually raised. It will be understood from these considerations that, while appreciating the value of Mr. Stewart's work in general, we could not feel justified in any unreserved acceptance and quotation of Mr. Stewart's figures in this particular connection. We preferred to make an estimate by calculation on clearly defined assumptions which seemed to us reasonable—insisting, however, that the estimate was merely tentative and preliminary to an experimental investigation. This is now in hand.

There will be a meeting of the Illuminating Engineering Society at the Royal Society of Arts on Tuesday evening, Dec. 13, when a discussion on "Progress in Gas Lighting in Relation to Illuminating Engineering" will be opened by Mr. W. J. Sandeman, of the Croydon Gas Company.

THE CHEMISTRY OF COAL AND ITS PRODUCTS.*

THE time is opportune for the appearance of this book. The enormous advance which has been taking place in the price of coal of late years, and the increasing recognition of the possibilities that exist for its more economical utilization, have combined to urge the importance of greater care being exercised in its selection by the purchaser.

Apart from its importance as the foundation of the gas and coke making industries, coal is a dominant factor in the cost of many manufacturing operations. A wider and ever-extending interest is, therefore, to be expected in the methods of examination and analysis by means of which the suitability of coal, for the various purposes to which it is applied, can be ascertained. It is one of the principal functions of the book under notice to supply the information. But it has a much wider purpose than this. It embraces also the analysis and valuation of the residual products of gas and coke making, and of gas-purifying materials. Other subjects treated, which, not coming directly within the title of the book, are yet more or less closely connected with its subject, are analysis of water (as applied to checking the operation of steam boilers and coal washers), calorimetry, and pyrometry.

The book embodies, with additions, the laboratory course in fuel technology at Sheffield University; but it is not merely a class book. It is calculated to be useful to practical chemists in gas and coke works, as well as to students of fuel technology. The inclusion of such a wide range of subjects within the compass of a comparatively small volume has, however, necessitated some amount of compression and abbreviation in their treatment. The practical chemist will know what allowances to make for this, where the unguided student, possessed of only an elementary knowledge of chemical manipulation, may go astray. Thus, for example, in the examinations of spent oxide, the ferrocyanides are directed to be precipitated as prussian blue, which latter is then to be filtered-off, ignited, and weighed as ferric oxide. Now, in practice, it is very difficult to wash a precipitate of prussian blue quite free from the ferric salt with which it has been precipitated; and, if this be not done, too high a result is obtained. For this reason the method of valuation described is seldom resorted to where accuracy with comparative expedition is desirable. As another example, the directions that are given for determining the absorptive power of bog ore might seriously mislead the student or even the practised chemist new to the subject. He is directed to pass sulphuretted hydrogen through the material so long as any increase in weight occurs, after which the tube is to be swept through with dry air before being weighed. The effect of introducing air would, doubtless, be to decompose some of the sulphide just formed, reproducing ferric oxide in the material, and thus to prevent a correct result being obtained. The usual practice is to weigh the material in an atmosphere of clean coal gas both before and after the absorption of sulphuretted hydrogen, thus avoiding any risk of re-oxidation.

These are but minor blemishes in an otherwise excellent book, and, with one or two other slight lapses from accepted practice, which we have noticed, do not seriously detract from its value and usefulness. Indeed, considering the great variety of subjects with which the authors have dealt, and the considerable amount of information they have managed to compress within the limits of the book, it is rather surprising there are so few points to which exception may be taken. In the reference made to "net" calorific value on p. 118, the words "600 calories" should be "0·6 calorie;" the authors having here confused the so-called small calories with large.

The illustrations, though not numerous, are clear and helpful; and there are some useful tables and graphs in an appendix.

* "The Practical Chemistry of Coal and its Products." By A. E. Findley and R. Wigginton. London: Benn Bros., Ltd. Price 12s. 6d. net.

AN AMERICAN ON THE THERM BASIS.

At the time of the last meeting of the Institution of Gas Engineers, we were glad to have among us, as a representative of the American Gas Institute, Mr. Alfred I. Phillips, of New York, who was on a visit this side for the purpose of making a special investigation into the working of the Gas Regulation Act. Mr Phillips, since his return to America, has prepared a report upon the subject of his inquiry, from which the following is taken.

The South Metropolitan Company, the first undertaking to inaugurate the system of charging for gas on the heat-unit basis, did so on Oct. 1, 1920, under a Special Act applicable to themselves only. The first Orders under the Gas Regulation Act were made in March of this year; and such undertakings as have thus far come under it have barely begun to charge on the therm basis. The whole situation is unsettled and transitional; and it is too soon even to predict whether or not the new method of charging will prove successful. Nor can we tell what changes, if any, may prove necessary to make the operation of the Act otherwise satisfactory.

On matters of financial relief and freedom of the undertakings to fix their own calorific standards, I found almost unanimous

sentiment favourable to the Act. On the desirability of the new method of charging, however, I found wide differences of opinion. In fact, I firmly believe that the financial relief afforded by the Gas Regulation Act is the main attraction which it has for a very large majority of gas companies in England.

Some, however, under the leadership of the Gas Light and Coke Company and the South Metropolitan Company, are strong advocates of the new method. Briefly, they take the position that gas is a form of potential heat energy, and should, therefore, be sold on an energy—*i.e.*, heat unit—basis. They believe that it will furnish a good selling point in meeting the bitter competition with electricity, since electric companies have claimed an advantage in the fact that they are charging only for actual energy delivered. Also they believe it will discourage "stretching the gas," and especially, under the sliding-scale, encourage the delivering of the most economical quality.

I found others, however, who believe that the same results could be obtained equally well without discarding the cubic foot as the unit upon which the price is based. Especially the municipal corporations, who apparently received more adequate financial relief than companies under the Temporary Increase of Charges Act, 1918, quite generally seem opposed to the therm method of charging—(1) On the ground (quite generally admitted by all) that serious public misunderstanding of the therm basis of charging is inevitable; and (2) because of higher accounting costs. In fact, the manager of one municipal gas undertaking claimed that accounting costs would be increased as much as 10 p.ct.

Of the five large municipal corporations which I visited, the managers of two were strongly opposed to the Act; a third was neutral; and a fourth expressed no opinion. The position of a fifth is indicated by the fact that the corporation promoted, and, I understand, have recently had passed, a Bill, with a fixed standard of 450 B.Th.U. and with no provision for charging by the therm.

In a recently compiled list of 95 undertakings which have received Orders under the Gas Regulation Act there appear only about three municipal departments.

Calorific Standards and the Development of the Industry.

While the therm method of charging is in its infancy, and no definite conclusion as to its success can yet be stated, the calorific standards now being declared under the Act are the result of actual experience. Economic conditions and the necessity for conservation during the war largely determined the heating values maintained—at least by the bigger undertakings. So far as this matter is concerned, economic conditions to-day are not greatly different; and under the provisions of the Gas Regulation Act economic conditions with such practical limitations as actual experience has shown to exist quite naturally are determining the values being declared. These figures range from 400 to 550 B.Th.U., with a vast majority between 450 and 480 B.Th.U.

The present-day standards are closely linked with the development of gas-manufacturing conditions since the beginning of the war. The necessity for coal conservation, and for making the greatest quantity of gas from existing equipment, led to steaming vertical, and in some of the smaller plants horizontal, retorts, and also to a somewhat more extensive use of water gas, carburetted with only very limited quantities of oil. Several single-stage complete gasification processes were developed, and have found rather wide application in the smaller plants.

The manufacture of blue or lightly carburetted water gas is already fairly well understood, but nevertheless has been the subject of an investigation by the Institution of Gas Engineers. Moderate steaming of vertical retorts has been shown to be desirable under English conditions by the investigations both of the Fuel Research Board and of the Institution of Gas Engineers. With respect to complete gasification processes, it is a little early to say just what will be their economy, limitation of application, and ultimate development. The details of the situation, however, are of secondary importance; and the significant fact is that during the last few years economy and conservation have not only been permitted, but insisted upon by the Government. During this time developments have taken place which, I believe, would have been exceedingly difficult under fixed and inflexible standards, such as those that are very generally in force in the United States

Under the freedom now available, we may expect still further development of plants and processes to meet both local and general conditions. In London, for example, several installations of horizontal retorts are at present being constructed. Local conditions and the character of the coal generally used there seem to have made this type of carbonizing equipment desirable. In Glasgow, a single installation of vertical retorts with a total daily capacity of 18,000,000 c.ft. of gas is now nearing completion. Local Scotch coals produce a poor coke; and vertical retorts steamed rather hard should give particularly economical results. In fact, while the Scotch are cautious, and will make reductions slowly, I fully expect that in the future they will reach heating values of 400 to 450 B.Th.U. with substantial advantage to all concerned. Elsewhere horizontal or vertical retorts, carburetted water-gas apparatus, and, in the smaller plants, complete gasification apparatus, are being installed. Each situation is aiming to work and to develop its plant so as to make the most economical gas under its own local conditions. Few are, and none need be, hindered by uneconomical restrictions.

Reasons for Calorific Values Adopted.

Under these conditions, the following are some of the considerations which have led to a choice of calorific standard.

Straight coal gas made without steaming probably runs in England from 510 to 560 B.Th.U. The market is insufficient in most places to absorb all the coke produced. Thus most undertakings have found it economical to make some proportion of water gas, either by steaming or in water-gas sets. On the other hand, experience has shown that, when a very dry gas is sent out, naphthalene and dry meter troubles have become serious; and this has been particularly true when a heating value less than 450 B.Th.U. has been carried. Furthermore, street-mains, services, and house-piping, and meter capacities, in some cases, have tended to become inadequate, particularly when the heating value has been reduced below this figure. As a result, very many undertakings have settled-down to a practice of steaming their retorts by not over 20 p.ct. of the throughput of coal, and carburetting their water gas with not less than ¾ gallon nor more than 1½ English gallons of oil. In such cases, the resultant calorific value of the mixed gas has generally been from 450 to about 490 B.Th.U.

During the strike periods it was found that, in addition to meter and naphthalene troubles, extensive readjustments of appliances would generally be necessary were the heating value to go below this. Thus a combination of economic conditions and practical limitations have served to fix the present English standards.

In special cases—such as that of the South Metropolitan Company, who have found it practicable to dispose of all their coke at good prices—straight coal gas is still manufactured, and the calorific value maintained is therefore high. On the other hand, Plymouth affords an example of a place where the coke market is particularly poor. For years this Company have manufactured about 40 p.ct. of carburetted water gas; and under such conditions a standard of 425 B.Th.U. has become economical, and is the figure which has been declared.

In still other places where complete gasification plants are in operation, calorific values of 400 B.Th.U. have been chosen; while in certain localities I understand that even lower values are being maintained. All of this clearly shows that local conditions have determined the calorific values chosen, and amply confirms the judgment of the Fuel Research Board, who, in reporting their conclusions, said: "We do not consider that it would be to the ultimate advantage of any of the interests concerned that any one fixed standard of composition and calorific value should be prescribed."

Effect on the Consumer.

No evidence was discovered which would indicate that present English standards are in any way unsatisfactory from the consumer's standpoint, provided adequate pressure is maintained. In fact, with the exception of the representative of the London County Council, who claimed no experience with values below 485 B.Th.U., it seems to be generally accepted by officials of both private and municipal undertakings, public authorities, representatives of consumers' associations, and, in fact, by all with whom the matter was discussed, that 450 B.Th.U. gas can be used with entire satisfaction, with properly designed and constructed appliances.

One consumers' association complained that certain old-type industrial installations gave trouble below about 500 B.Th.U., but otherwise it was generally agreed that, except in rare cases, 450 B.Th.U. gas can be used in present apparatus with only minor adjustments. While difficulty seems to have been experienced by many when they went below 450 B.Th.U., yet most seem to feel that even down to 400 B.Th.U. existing appliances can be adjusted to give good satisfaction. In fact, I saw gas of this calorific value in successful use. Below 400 B.Th.U., I am not convinced that satisfaction can be obtained without radical alteration of burner appliances.

Lower Heat Values.

In spite of bitter competition from electricity, the English gas industry has largely retained both its domestic and street incandescent lighting. How much the low heating value gas has had to do with this, I cannot say; but during my two months' stay in England I did not see one black mantle, nor have I ever seen more excellent street lighting. I was told that, with the lower heating value, gas-blackened ceilings have been unusual. In one city I learned that the decrease in calorific value had resulted in an increase of industrial business; it being claimed that the leaner gas was more suitable for the desired purposes. In fact, I found none who advocated heating values over 500 B.Th.U. except on the ground of production and distribution economy.

Diligent search failed to reveal any definite data showing the effect of reduction in calorific value upon the consumers' use of gas. Opinion on this subject varied greatly, though a large majority appear to believe that in actual practice with low calorific values (say), 450 B.Th.U., the consumer is more apt to obtain better efficiency than with a richer gas. All agree, however, that substantial increase in consumption would take place.

English conditions in this respect are radically different from our own. The experience of English gas engineers during the time they have been studying this subject has not extended to gas much above 550 B.Th.U., and has been more generally confined to the limits of 425 to 525 B.Th.U. In this range, a fairly dry and stable gas is produced—especially with English coals,

which, as already mentioned, yield a rather low percentage of illuminants, and hence of condensable hydrocarbons.

The whole question of effect of reduction in calorific value on consumption is still unsettled in England. In a general way, I believe opinion has been largely based on the laboratory tests of the Fuel Research Board and of the Institution of Gas Engineers, which rather indicated that efficiency is independent of calorific value per cubic foot. In the Board's report, however, it is stated that "the experimental proof of this parity (of heat units) is still incomplete;" and I believe that, in the opinion of the Board, this statement still applies.

CONCLUSIONS.

This report will have failed entirely in its purpose if it has not made clear that a vast difference exists between our conditions and those in England. How far it is practicable to make use of English experience, and incorporate the methods of that country into our own practice, is a question requiring mature consideration. Methods of regulation and rate-making, public relations questions, and manufacturing conditions make the situations in many respects hardly comparable. England started with calorific standards generally later than we did. War conditions hastened their development. Finally, a combination of local circumstances led to the passing of the Gas Regulation Act.

Whether or not the "therm" method of charging under this Act will prove successful in England, is still an unsettled question. That it is better adapted to English conditions than to our own, there can be but little doubt. In England there is no public relations question as we have it; and yet misunderstanding and dissatisfaction appear to have been usual among domestic consumers where the "therm" method has been inaugurated. In this country I can hardly believe that it would be received by the public any more favourably than zone trolley fares.

Furthermore, in England there is a distinct tendency to leave utilities alone. The maximum or standard price is fixed; and if from time to time the undertakings desire to change their calorific value, they may do so under the "therm" basis without disarranging their maximum price or sliding-scale provisions. If they make savings thereby, the disposal of them is already provided for under the provisions of their Acts. In this country, however, rates are based on costs of operation, depreciation, and contingencies, *plus* a fair return on the value of the property.

APPLICATION TO AMERICAN CONDITIONS.

It is hard to believe that with us any change in calorific value could be made without a public hearing at which the authorities would probably be requested to fix a new rate in accordance with the above principles. There seems no great advantage in having such a rate expressed in therms rather than cubic feet. If other principles are to govern the price, as in England, then our rate-making system must be altered. But the advisability of doing so is a question quite outside the scope of this report. These comments are not in any way intended to condemn the "therm" method of charging, but merely to indicate the radical differences between English conditions and our own, and the need of caution in adopting English methods without thorough investigation.

Likewise, the fact that English undertakings have generally adopted calorific standards of 450 to 480 B.Th.U. is not necessarily a reason that we should do so. Economic conditions have determined English standards; and, with due regard to the satisfaction of the consumer, economic conditions should determine our own standards. This much we can say definitely, however, 450 B.Th.U., and even lower, calorific values are being satisfactorily and efficiently used in England to-day in appliances which appear less easily adjustable than our own. General opinion is that the service has improved. Freedom from restrictions as to calorific value has led to the maintenance of the most economical figure for each particular undertaking, taking into consideration not only general prices and conditions, but also the character and size of the plant, the extent and capacity of the distribution system, the adequacy of metering equipment and house-piping, and, finally, the purposes for which in general the gas is used. It has led to development of new methods and processes, the benefits from which must ultimately accrue to the consumer.

That it is in the interests of neither the consumer nor the utilities to require compliance with uneconomic and burdensome restrictions, was recognized by the Fuel Research Board in their well-known report. It was likewise recognized in our Calorific Standards Committee report of last year. It is merely the reiteration of the principle that calorific standards should be based in every case upon local economic conditions. The experience of England has confirmed the soundness of this principle in actual practice; and it could but be to our advantage to follow her lead in this respect.

I can think of nothing which would be at the same time more stimulating to the progress of the gas industry, and ultimately more beneficial to its consumers, than the removal of all heating-value restrictions—thus permitting each company to choose the calorific standard best suited to its own particular conditions. Rates should then be fixed in accordance with our recognized principles of regulation. In such circumstances, we might well look forward to an unhampered growth and development at least equal to that which is to-day taking place in England.

SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS.

A MEETING IN LONDON.

The General Meeting of the Association was held on Tuesday of last week, at the Charing Cross Hotel, Strand, W.C. The PRESIDENT (Mr. J. Wesley Whimster, of Bath) was in the chair; and there was a considerable attendance of members.

MINUTES CONFIRMED.

The PRESIDENT suggested that the minutes of the last meeting as published in the "JOURNAL," should be taken as read.

This was agreed to.

ELECTION OF OFFICE-BEARERS.

The PRESIDENT said the next item on the *agenda* was the election of President for 1922. He had great pleasure in proposing that Mr. J. M. Campbell, of Margate, be the President next year. He was sure he need not say anything regarding Mr. Campbell. He was well known to all the members; and he (the President) was sure they could not have a better man in the presidential chair. He was a Scotsman; and he was none the worse for that. [Laughter.] For this reason he thought it gave him even greater pleasure to propose his election. Mr. Campbell had been a very useful member of the Committee during the past year, and in fact before that. So he was quite certain that he would make an excellent President.

Mr. A. W. SUMNER (Grays) said he had great pleasure in seconding the motion. He was sure the members in South-East Kent would be glad they were to have a President down their own end this time; and he was sure also that they would be looking forward to the invitation which would be extended to them in due season to visit Margate. [Laughter.]

The motion was carried with applause.

Mr. CAMPBELL said it was with very mixed feelings that he regarded this election, although he most cordially appreciated the honour the members had conferred upon him in electing him to be their President for next year. He appreciated, however, the remendous responsibility attaching to the office, while at the same time he realized his own limitations and shortcomings. But he should do everything he possibly could to carry out the duties to the satisfaction of the members. He knew that he should have the assistance and co-operation of their most genial Hon. Secretary, as well as of the Committee, in carrying out all that was required of him in connection with the post. There was one matter that gave him a great amount of pleasure in connection with this honour. It was that he believed, with the sole exception of the late Mr. Valon, of Ramsgate, this was the only occasion on which South-East Kent had been represented in the chair before. This was something he was naturally rather proud of; and he should endeavour to the best of his ability to carry out all that was needed of him, and to hand over the position at the end of the year in the same untarnished condition in which it would be handed over to his own hands next March. He saw that the next item on the *agenda* was the election of Vice-President for 1922; and he had been asked to propose to the members a name which he was perfectly certain would command their ready acceptance. This was the name of Mr. P. S. Hoyte, of Plymouth. He thought most of the members were aware of Mr. Hoyte's fitness for the position, and those in the West of England knew his great value to them—indeed, to the whole industry. Therefore, the motion would be cordially approved by them particularly, and by the whole Association in general. He had known Mr. Hoyte for the last sixteen or seventeen years. He was quite close to him in Devonport for about three years; and he had kept in intimate touch with him ever since. They had been excellent friends all the time.

Mr. JAMES TAYLOR (Weston-super-Mare), in seconding the motion, said Mr. Hoyte had been a most energetic member of the Western Section. He was at the present time Chairman of the section; and he had taken the greatest possible interest, and had done an immense amount of work, in connection with every organization associated with the industry in the West of England. In addition to being Chairman of the Western Section of the Association, he was Vice-Chairman of the District Committee of the Federation of Gas Employers. He was also Vice-Chairman of the National Gas Council District Board, as well as an active member of the General Committee of the British Commercial Gas Association—in fact, in all gas activities in the West of England Mr. Hoyte was one of the foremost men to be relied upon by the district. They attached the highest value to his work, and to his

valuable assistance down there. There was not the slightest doubt that in good time, when he attained the office of President of the Association, they would have a most energetic and valuable President, and one who would add to the high lustre of the presidency of the Association.

The motion was carried with applause.

Mr. HOYTE said he felt most deeply the very kind things which both the proposer and seconder had said about him, and for his election by the members to the vice-presidency of the Association. It was the first time that any Engineer of the Plymouth Gas Company had held an official position such as Vice-President in the Association; and he therefore fully realized what this meant. Like Mr. Campbell, he regarded it with certain mixed feelings, and in one respect as a doubtful compliment. He had been a member of the Committee for some years now; but he was ashamed to think how many meetings he had missed. The members, however, would realize how far away from London Plymouth was situated, and, with the great activities in other directions, it was very difficult indeed to keep pace with the many meetings which it was desirable, if not absolutely necessary, to attend in these times. He was very keen on his work; and he should do his utmost during the ensuing year to support his old friend, Mr. Campbell, in the chair.

The HON. SECRETARY (Mr. W. H. Bennett, of Redhill) said that Mr. G. M. Gill and Mr. C. H. Rutter had been elected Eastern District representatives of the General Committee in place of Messrs. C. Chambers and W. E. Price. The Western District representative on the General Committee who had been appointed was Mr. R. Robertson, in the place of Mr. P. S. Hoyte.

Proposed by Mr. C. V. BENNETT (Rochester), and seconded by Mr. D. T. LIVESEY (East Grinstead), Messrs. J. Donaldson and J. Urquhart were re-elected Hon. Auditors.

The PRESIDENT said he had much pleasure in proposing the re-election as Hon. Secretary and Treasurer of their friend, Mr. W. H. Bennett. Having as President had about seven or eight months' experience of Mr. Bennett, he could say confidently that the Association could not have a better Hon. Secretary. He was most energetic; and he warned Mr. Campbell that he would be kept up to the scratch. He would not be allowed to overlook things, or be even a little bit late. He could assure the members that Mr. Bennett was an ideal man for the secretaryship. They all knew the character of his work; so that he need not expatiate upon it. There was one point that he desired particularly to mention, which was the question of arrears in members' subscriptions. It was a matter that had been mentioned before, but evidently previous references had not had the desired effect. There were several subscriptions outstanding; and it meant a good deal of work thrown upon the Secretary to be continually sending-out notices. Apart from this, there was the general expense of sending out the monthly returns. They had a rule under which, if subscriptions were not paid by a certain date, the members could be taken off the list. The Committee had had this matter under serious consideration; and they felt that they must in future strictly conform to the rule. It might not be necessary to go to the extreme; but he hoped the members would see that subscriptions were paid promptly in future.

Mr. W. J. SANDEMAN (Croydon) said he had great pleasure in seconding the motion. From their experience of Mr. Bennett, they all knew it was impossible to have a better Hon. Secretary.

The motion was carried with acclamation.

The HON. SECRETARY said he was much obliged to the members for re-electing him to the office. The usual thing was to apologize for accepting such positions. But he did not apologize at all, for this reason: He could honestly say since he had been Hon. Secretary he had found it a very pleasurable office. He had come into contact with many men whom he might not otherwise have known. He thought that perhaps he was rather selfish in taking the office for another year, because he was sure that, if he threw up the office now, and somebody else took it up, he would soon wish that he had occupied the position before. He should however be glad to serve for another twelve months, and perhaps then somebody else would come along, and do the little work required, and get all the honours and pleasures that the office brought with it.

ILLNESS OF LIEUT.-COL. WOODALL.

The PRESIDENT mentioned that the Hon. Secretary had received about forty apologies for absence. One of them was from Lieut.-Col. Woodall. The members would be sorry to learn that he had had to undergo a very serious operation, but they would be pleased to hear he was going on satisfactorily. The Hon. Secretary had sent a letter to Lieut.-Col. Woodall, the terms of which were in anticipation of what he (the President) was sure the members would wish to say.

ELECTION OF NEW MEMBERS.

The PRESIDENT said several gentlemen had applied for membership, and had been accepted by the Committee. He would ask the Hon. Secretary to read the list of nominations, and, if they thought fit, to approve of it.

The HON. SECRETARY read the list as follows: Mr. L. G. Humphrys, of Bexhill; Mr. W. J. Imbrie, of Yeovil; Mr. Stephen Lacey, of the Gas Light and Coke Company; Mr. J. R. Love, of Topsham; Mr. F. A. Matthews, of Bournemouth; Mr. W. Norris, of Burgess Hill; Mr. F. J. Pearce, of Hendon; Mr. H. T. W. Pilbeam, of Santos, Brazil; Mr. C. E. Shepherd, of Midsomer Norton; Mr. H. C. Smith, of Tottenham; and Mr. F. J. Worthington, of Honiton.

The members adopted the nominations.

PAPERS AND DISCUSSIONS.

There were two papers read. The first was on

"The Organization and Administration of a Distribution and Sales Department," by Mr. W. J. SANDEMAN, of Croydon; and the second on

"A Method of District Pressure Control," by Mr. Percy S. HOYTE, of Plymouth.

The first paper, with a report of the discussion, is given on p. 687. Mr. Hoyte's paper was published last week; and the discussion appears on p. 692 this week.

VOTES OF THANKS TO THE AUTHORS.

Mr. C. F. BOTLEY (Hastings), in proposing a vote of thanks to the authors of the papers, said he might tell Mr. Sandeman that he was contemplating copying him in his practices. With regard to Mr. Hoyte's paper, the gas industry was indebted to Plymouth for many useful things which had been produced by Mr. Hoyte in conjunction with Mr. Widlake. He mentioned that he was not quite clear as to what Mr. Hoyte meant by a "loop circuit;" and he further mentioned that he found the G.P.O. were, as a rule, very difficult to deal with. But perhaps they now wanted custom, and, in view of this, might be generous to gas undertakings in this particular matter. It seemed to him that the device Mr. Hoyte had brought before them met a great want, especially in these days of the operation of the Gas Regulation Act, and particularly on Sundays. It seemed to him they would require the gauge part of the device at every point with which they desired to deal; and this would mean that they would have to send round once a week to clean the terminals. Therefore, in considering the matter of district pressure control by this means gas engineers would want to know what they were doing in respect to cost by embarking upon the system. Anyway, his present purpose was to propose a very hearty vote of thanks to the authors for the most valuable information the members had received from them.

Mr. G. M. GILL (South Metropolitan Gas Company), in seconding the motion, complimented the President upon his choice of papers for the meeting.

The PRESIDENT remarked that, before putting the vote to the meeting, he should like to say in reference to what Mr. Gill had said as to the choice of papers, he was previously afraid that some of the members would be disappointed, and would expect something on carbonization. On this occasion, however, they had gone from the works to the district, and he hoped and believed the matters put before them had been to the liking of members.

The motion was then put to the meeting, and was carried by applause.

Mr. SANDEMAN, in acknowledgment, said he felt he should be more than repaid for what he had done in preparing the paper if it had proved to be at all interesting to the members. There were a great number of points in it which they had not had an opportunity of discussing on the present occasion; and this was partly due to the fact that the forms accompanying the paper were not ready for distribution until that day.

Mr. HOYTE said he also thanked the members very much for the way they had received his paper. He should convey these thanks to Mr. Widlake, to whom was due the honour for the ingenuity of the instrument that he (Mr. Hoyte) had been able to place before the members.

Mr. W. B. FARQUHAR (Ilford) proposed a hearty vote of thanks to the President for occupying the chair in such a distinguished way as he had done. It was due to Mr. Whimster that they had had such a successful meeting.

Mr. C. CHAMBERS (Harrow), in seconding, said that this vote was, so to speak, only an "interim dividend," seeing that the President would receive a vote of thanks at the termination of his year of office next spring. They had had experience of the way he conducted their meetings, and those who were members of the Committee had seen the splendid work that he had done at the Committee meetings. All would therefore join in giving him a hearty vote of thanks.

The PRESIDENT thanked the members very much indeed for the way they had received the proposal. It had been a great pleasure to him to do anything he could for the Association. He was more than delighted with the papers they had heard that afternoon. Before closing the meeting, he would like the Hon. Secretary to read a letter that had been received from the Illuminating Engineering Society.

PROGRESS IN GAS LIGHTING IN RELATION TO ILLUMINATING ENGINEERING.

The HON. SECRETARY said the letter to which the President referred was one he had had from Mr. Gaster, Hon. Secretary of the Illuminating Engineering Society. In it, attention was called to a paper on "Progress in Gas Lighting in Relation to Illuminating Engineering," which would be presented by Mr. Sandeman, at the meeting of the Society, on Dec. 13, at eight o'clock, at the Royal Society of Arts. The letter extended a general invitation to the members of the Association who could be present on this occasion.

Before separating, the members had tea together.

THE FULL UTILIZATION OF BITUMINOUS COALS.

First Article.—What Constitutes the Coking Quality of a Coal.

[COMMUNICATED.]

THE full use of bituminous coals naturally lies along lines of distillation—*i.e.*, the transformation of the dense raw coal into fuels of higher availability, gas, oils, tar, and coke. The complete carbonization of coal falls primarily into two classes, both high-temperature processes—viz., coke-oven and gas-works practices. The one aims chiefly at coke, the other at gas, but with production of coke of a kind. In recent days, a third class has been introduced; but, truly speaking, it is a partial carbonization, and is characterized by a low-temperature treatment of special classes of coals with a high volatile content, and preferably of non-caking (in present terminology) qualities. Cannels are among the coals best adapted to low-temperature treatment.

In both the high-temperature systems a certain amount of volatile matter is essential; otherwise the amount of the distillate obtained is inadequate to warrant the cost of operating. Also the quality of the residue produced is so poor that no coherent coke can be isolated. Coals carrying no volatile are non-bituminous; those with little, semi-bituminous. The range of volatility usually extends from 16 to 40 p.ct. for carbonizable coals; but the range for coke-oven coals is from 18 to 33 p.ct.

In the wide use of the term bituminous, it can be accepted that the bituminous coals lie and comprise all those within the former limits; whereas in the narrow sense of the word bituminous, the latter limits are nearer the true representation. Of course it must be understood and constantly borne in mind that, in translating the word bituminous, the original meaning dealing with the raw substance of the coal structure must be distinguished from the consequences thereof under present carbonizing conditions. So that when using the word in the realm of effects, it should be remembered that these are at present relative to such carbonizing conditions as well as to the amount and ratio of each, and the total quantity of the various bituminous substances in the coal. Then it must also be remembered that the behaviour of any simple bitumens or complex thereof does not remain unaffected by the retort conditions, which evidently can be varied without limit, so that a far from rigid position obtains.

It has been believed that the formation of a compact, coherent, porous coke is dependent upon the amount of bituminous ingredients present in the coal structure and substances. But this has not been invariably borne out in practice, in the strict sense of the ratio of total bituminous material to caking qualities. The exceptions are so plentiful as almost to invalidate the rule. Recently, owing to the work of various researchers, it has been discovered that the coal substance has two main classes of bitumens: (*a*) resins, (*b*) celluloses or humus. The true caking coals have been found to be such as have not only a certain minimum amount of each bitumen, but certain ratios of each, and by way of preference not exceeding a certain total amount. Coals which can be carbonized but commonly yield gas cokes are found to have a preponderance of humic or cellulosic materials, whereas coals which yield good coke, but which are troublesome owing to excessive expansion (which further is not followed by sufficient contraction to liberate the charge from the side walls) are found to contain an excess of resins.

The dependence of a coal (as to its caking qualities) upon bituminous ingredients—resin and humus or celluloses—is borne out by the mixing of coals to produce a better composite mixture than either of the separate ingredients in respect of coking suitabilities, which proves that the ratio rather than the total amount of the two classes of bitumens in bituminous coals is the deciding factor, once the minimum of each is present.

The above decisions have been arrived at as a result of an examination of the coal substance chemically, by analysis and the action of solvents, and microscopically in thin sections [*vide* the work of Messrs. Burgess, Wheeler, Jones, Pictet, Lomax. Knox, &c.], and the behaviour of coals so examined by carbonization under conditions analogous to present-day retorting systems.

Further investigations—varying the conditions of carbonization, respecting the heating temperature, the rate of heat transmission to the charge, the mode of heating (whether by external or internal methods alone, or in combination), the mode and degree of withdrawal of the distillate—have, however, revealed that the amount of total bituminous ingredients to the ratio of resin in the total is by no means an absolute minimum equal to that now required. Considerably less total bituminous material containing considerably less resin can, by variation of the mode of treatment exercised by control or manipulation of the factors of the process like the mode and rate of heating, and the thickness of charge, the carbonizing temperature, &c., be used to yield good furnace coke from coals now incapable of producing such a coke.

As Mr. Myers has indicated that the subject of coking quality in a coal is still intricate and rather little understood, the writer will try to throw some light on the subject *per se*, and show how full use of the new knowledge has been made available in a simple and practical manner in the system of carbonizing for which he is responsible.

The influence of the bituminous ingredients of coal in the production of coke is again well borne-out by the effects of adding pitch and/or tar (preferably heavy tars) to non-caking coals. American practice has often resorted to this means, where and when the circumstances have both needed and permitted it. The addition of such extraneous bitumen is, however, not an easy task under present systems of charging and retorting, whereas it is provided for quite simply and effectively by top mechanical charging and retorting with part internal heating, so using-up the tars (inherent and introduced) more rapidly and effectively, and without graphiting on the retort-walls.

The extraneous introduction of carburetting ingredients—*e.g.*, heavy vaporized hydrocarbons—is another proposal which has received French and German attention, if not American. This has been made use of in a few instances for rendering non-caking coals caking, and also for improving semi-coking coals. In both cases, however, the above suggestions have suffered, owing to the rather serious quantitative liabilities involved in material, handling, and heat—inevitable under present pressure carbonizing methods. These systems require more than appreciable amounts of bitumens before coke of good qualities can be produced. Why? Because the process is slow; so that for fully two-thirds of the coking period a considerable portion of the bitumens have escaped without contribution to the coke-forming process.

Here we can seek the confirmation of another worker. Dr. Gray has found that the caking quality of low-grade coals can be improved by modification of the process and retort design—*e.g.*, by changing the carbonizing temperature, the rate of heating, the mode of transmitting the heat to the charge, and the form of the charge respecting length, breadth, and depth. But if last, certainly not least is the effect of the mode and degree of suction that can be applied to the charge for the withdrawal of the evolved and other gases passing across the charge. This should be so arranged as to fulfil the following conditions:

1. Offtake of the gases through zones of decreasing temperature; so that the sensible heat of the gases can be used in the heating and conservation of the distillate in its virgin state as far as possible.
2. Preventing the swelling of the charge due to imprisonment of the gases in the tarry mass of intumescent coal, which results at present because of the absence of any suction or offtake in position adjacent to the charge.
3. Early consolidation of the intumescent charge into hard coke.

FACTORS IN COKE FORMATION.

In carbonizing coal in a coke-oven, the charge passes through, first, a softening process even melting sometimes—intumescence; and, secondly, through a consolidating process. The first stage of plasticising is expansive; the second, of consolidation into coke, is contractive.

The degree of plasticity is dependent upon the total bitumens present; and as cellulosic bitumens (or humic) preponderate over the resinic, the melting is softer and the expansion less forceful, although owing to the heat-expansion the charge does at its critical point probably fill the oven and exert a moderate force against the walls. But it is only for a short time, as the celluloses readily disengage their pent-up gases; so that cellularization soon sets-in, with its concomitant contraction. The expansion of a coal over and above that due to heat (a very small amount indeed) is really due to the resins and their action in locking-up the gases within their globules, which (if no suction is present) prevent the speedy liberation of the distillate but cause enormous expansion of the charge against the heating walls, with terrible strain thereon, for fully three-quarters of the coking period (under present conditions). There is no value whatever in this procedure; in fact, large coke-cells tend to be formed, particularly with slow heating and low temperature, so that the structure is weakened, and this despite the fact that it is the selfsame resins which contribute graphite coatings by the decomposition which sets-in eventually and the dehydrogenation of such resins, leaving carbon as a deposit over the coke-cells, and with evolution of CO and H_2 to the gas. Therefore we find resinic coals cause expansion troubles, and also yield large celled coke; and cellulosic coals without resinic sufficiency yield only gas cokes, whereas the best blast-furnace coke is obtainable by using a coal with a sufficiency of each, and preferably a certain ratio of each. This is a particularly vital point, of course, under present retort systems.

The ideal blend in the coal substance is that containing a sufficiency of both resin and humus, whereby a semi-plastic intumescence is obtained without liquefaction on the one hand and excessive expansion on the other, but wherein filling of the retort with the charge, even after complete intumescence is realized, is such that only a moderate pressure is put on the walls—sufficient to consolidate the mass and allow the ensuing contraction to realize a hard coke. It is this balanced set of composite conditions alone which realizes the best coke—that is, one of a small, porous, hard, dense structure.

The advantages of this system of retorting, in the above respects, are due to the greater independence which ensues in the first case of the quantity of such bitumens—absolutely or relatively present—and in the second place of the evil effects of excesses (of excessive expansion and weak coke according as the ratio of resins to humus is in excess, or contrariwise, respectively), and which position results from control over the rate of heating, the temperature, and the suction, and if necessary the gaseous atmosphere; for, by such control, full use can be made of whatever quantity is present, and so satisfactory results obtained with the minimum available coke-forming ingredients.

ORGANIZATION AND ADMINISTRATION OF A DISTRIBUTION AND SALES DEPARTMENT.

By W. J. SANDEMAN, of Croydon.

[Extracts from a Paper read before the Southern Association of Gas Engineers and Managers.]

PART I.—GENERAL INTRODUCTION.

In introducing this subject, I propose to confine myself to the purely business or commercial side, as this to my mind is still, notwithstanding the efforts of the British Commercial Gas Association, being sadly neglected in our industry generally.

Many of us, even now, do not appear to appreciate the scope for commercial development. Quite recently, a large gas undertaking was advertising for a sales manager at a salary of £350 per annum! The administrators of this particular undertaking must have a very limited outlook as to the possibilities of their business, if this is all they are prepared to offer the head of the department on which the future of the concern so largely depends.

It is to the commercial man, who can combine sound business training and ability with the technology of the utility of gas, that we must look for organization and business development; and until our industry is prepared to offer the commercial man a position at least comparable with that offered by every other industry of importance, it will never induce the right type of man to join its ranks. Indeed, so far from getting efficient recruits, it will lose the energetic men it has got unless it makes their jobs worth having.

Our competitors are recognizing the commercial man and stimulating a demand for good recruits. As a result, the electrical industry is becoming increasingly competitive; its activities are ever-widening, because the value of "young blood" is recognized, and to-day commercial electricity is regarded as a good "line" for young qualified men. Contrast this with the general prevailing apathy which exists in our industry!

We must recognize the commercial or business side of the industry as one of the determining factors in its future development. One has only to have a sufficiently open mind to appreciate what can be done in the matter of efficient administration to discern quickly the need for the scientific direction and supervision of business development.

In my own case, I had never been satisfied with the general policy and working methods of my department. Accordingly, some few years ago, I commissioned one of my assistants to scrutinize systematically all existing procedure, and to report fully upon the lines of reform that suggested themselves to him. Valuable data were compiled in this way; this being the basis upon which more efficient systems were evolved, and business policy adapted to suit the changed conditions brought about by the war.

ORGANIZATION.

The present stage is, I think, a fitting place to define my conception of organization. Organization proper, as I interpret it, is a due construction of parts—*i.e.*, when applied to business, a grouping together in sections of all matters connected with the entire business functions of an undertaking, in such a manner that every operation has a specific scope and a determinable financial relationship to the final working results.

Each section should be supervised by a responsible person (who knows the relationship of his immediate section to that of the general business policy), and all the sections should operate with reference to the whole department along lines of predetermined policy. Isolated sections and inconstant practices are very serious hindrances to business advancement. Each operative in every section should be a "spoke-in-the-wheel"—each individual having his duties well defined in order that initiative may be stimulated and negligence easily traced. The section supervisors should receive instructions from the departmental chief, and report weekly in a scheduled form as to working results and matters outstanding. This resulting "cog-in-cog" action eliminates overlapping, and gives every employee the satisfaction of knowing that he is part of the organization. It is necessary that the whole staff be fully acquainted with the business policy of the undertaking, so that each man may see a matter from the other fellow's (or from the management's) point of view. Successful organization can only be ensured by co-ordination.

ORGANIZE BY CO-OPERATION.

This leads me to the next point which I desire to emphasize, organize by co-operation. Seek suggestions from your staff. Take them into your confidence and ask them if they have any observations to make regarding their own particular daily jobs. Tell them the difficulties of the management; get around the same table; thrash-out ideas together by "pooling" the available brains; stimulate and foster the asking of questions; hold occasional educational talks, and help deserving men to get up the ladder. Never appropriate another man's brains for personal benefit. If a "spoke-in-the-wheel" achieves something noteworthy, give him personal credit and tangible recognition for it. He will then never hesitate to come forward with something else at another time. Show every member of the staff to whom you, as the chief, are personally indebted for the efficient running of your business that, in benefiting his undertaking through earnest co-operation with his chief, he is helping himself forward. I am sure that recognition of this kind (or the lack of it) is often the initial movement towards a particular man's ultimate destiny. It is well to remember that, by giving your assistants a little more freedom of action, you are on the surest way to discover real disposition and ability. Shun standing in a man's light or exploiting him, as you would the plague! Exploitation has a very bad effect morally. It either creates apathy or else the determination to go elsewhere in pursuit of more equitable treatment. These are the essential human elements of organization which not one of us can afford to ignore.

We must lay ourselves open to educate and train (as far as opportunity presents itself) those whose operations we are privileged to direct and supervise. Much can be done through setting a good example. The chief who "slacks" cannot expect his staff to be brisk! Happy and contented working must be our objective, because the finest systems and methods are "lost" upon an unsympathetic and slow-responding staff. As the basic guide to organization, I would suggest to you the following points:

(1) Aim always at conciseness and simplicity.
(2) Remember that quickness and precision are the very life of business.
(3) Base your style of organization upon personal inquiry into the needs for commercial reform in your business. Business policy must be largely governed by local conditions.
(4) Think out your line of action for yourself; do not copy or imitate what somebody else is doing.
(5) Don't "hang fire"—because on the face of it the task seems heavy. The task is surprisingly light, and particularly interesting, when you really get down to it.
(6) Grasp the fact that personal activity has a direct effect upon the "tone" of your business.
(7) Let utility, rather than theory, be the object of your research.

COMMERCIAL INQUIRY.

Coming now to lines of commercial inquiry, you cannot, I think, do better than ask yourselves these simple questions.

(1) Are you able to cope with all the business you are getting in a prompt and remunerative manner?

If not, what is preventing this—(*a*) Is it a question of lengthy routine? (*b*) Is it labour? (*c*) Is it materials? (*d*) Is it transport? A negative answer to the first question and affirmative responses to any (or all) of the four suggested causes will immediately indicate the need for revision of policy and working methods. Go no further with your commercial research until you have first remedied these matters. Do not start "pushing" business until you can efficiently tackle that which you are now obtaining in a normal manner.

(2) Of your present "possible" business inquiries, do you know how many actually mature?

Assuming, as is the case in Croydon, that 75 p.ct. of new installation work of any size is estimated for, do you know how many of these estimates are accepted and how many are declined? If declined, do you know the reasons? Presuming you are able to give the general advice called for, and estimate for all inquiries, you will probably find that most of the reasons can be put under the heading "too costly." Knowing this, what steps is it possible to take to reduce working costs? Are you buying materials at competitive prices; and seeing that time is not wasted? Then, again, there is the question of profit on work. Is this cut to the minimum compatible with a self-supporting policy of the new business section?

Half-yearly figures, in the aggregate, afford very little data upon which to base conclusions as to the financial aspect of the policy in any particular section of the department. One needs an analysis of costs, and an analysis of revenue. The experience of the past two years has taught me that only by efficient costing systems (separately designed, on a uniform basis, for each section of the department) can the desired analysis of working expenses be obtained, and monetary leakages "trapped." Reducing everything to the £ *s. d.* standpoint conveys an accurate impression as to the true position of affairs. It opens one's eyes (at any rate it did mine) to the need for strict commercial supervision.

I may here mention that my assistant who was dealing with this question, more than saved his year's salary in the first few weeks of our reorganization movement on two matters which appeared on the face of them to be quite small and unavoidable expenses. As a matter of fact, they were actually (when properly figured-out) anything but small; and by a slight modification of policy they were shown to be avoidable to the Company, inasmuch as these particular expenses could be borne by the consumers without any fear of prejudicing new business. The total result of our investigations has produced a general speeding-up, an appreciable increase in new business, and a saving to the Company (most of which the consumers have had the benefit of) of many hundreds of pounds per annum.

(3) When you have taken action which will show better working results in the foregoing directions, you can then turn your attention to serious selling propaganda, being assured that you are on the "right track" to secure a good measure of success.

Propaganda will never achieve much if the fundamental business policy is at fault. As an instance: You receive fifty inquiries for new appliances. Estimates are furnished, and only 20 p.ct. are accepted. This is a bad result, but propaganda will

not eliminate the basic trouble if the business is turned-down on account of cost. You must look for improvements in your policy and organization whereby working costs can be reduced, and a scheme presented to your client in a more acceptable form. If, as a result, you find that 50 p.ct. of your estimates or inquiries mature (and our acceptances were increased from 32 to 60 p.ct.), then go ahead with your propaganda. A minimum of 50 p.ct. of acceptances should be strived for; if the percentage is much below this, you have pretty sure evidence of business hindrances in some shape or form.

PART II.—BUSINESS POLICY.

In considering the question of routine we must, of course, deal, in the first instance, with the scope of a distribution and sales department. For the purpose of a general definition in this connection, I think we may say that the work of this department commences at the works governors and ends a little in advance of the points of consumption. It should terminate with a careful and periodical survey of appliances; first, to ensure them being kept in an efficient condition, and second for the purpose of replacing obsolete with up-to-date methods of using gas. The department should control all matters connected with the demand for, and the utility of, gas, and should govern the policy regarding the capacity of trunk mains, district pressures, main and service laying, &c. As the service side of the undertaking, it is most essential that the control of pressures should be under the supervision of the department responsible for the efficient working of all gas consuming appliances; for, as we are all only too well aware, lack or excess of pressure accounts for a very large percentage of district complaint work, which, if costed, amounts during the year to a serious item. Expenses of this character must, of course, be faced; but I feel most strongly that we have much to do in this matter of getting-down maintenance costs. I do not for one moment wish to indicate that we should discourage complaints. In my own opinion lack of complaints is not necessarily a healthy sign. I regard them as an indication that consumers recognize the efficiency of gas appliances, and also our ability to rectify any defect. Complaints are a valuable asset provided they do not arise from inefficiency of supply, bad workmanship, or faulty judgment on the part of those responsible for recommending apparatus; and provided always that the percentage of defects remedied is close on the 100 mark! No distribution and sales department can be considered replete unless it has well-appointed showrooms and properly equipped repairing shops. With regard to the question of showrooms, few of us, I venture to think, realize to the full their value. If properly laid-out they are, to my mind, far and away the most potent of all advertising and publicity mediums, excepting, of course, actual working evidence on the district. Showrooms are, I fear, too often thought to be places for the exhibition of anything of an elaborate character, irrespective of whether such goods are practical selling lines or not. My motto is: "Show and demonstrate only those things which represent business to the undertaking and efficiency to the consumers." Do not attempt to "run" several lines of the same sort. Satisfy yourself, by experiment and trial, which is the best article of its type at the price which makes business possible. When you have got the right article, then push it. Showroom space is far too valuable to waste on the display of articles with very doubtful selling possibilities.

A showroom should be the place where a practical demonstration can be given of all the latest appliances on the market. It must be replete—but only with real live stuff—with both domestic and industrial appliances. In passing over this inadequate reference to showrooms, may I emphasize the absolute necessity of employing properly trained salesmen? It is not enough to know what the article is and the price; to demonstrate it, you must know its functions, its running cost, and how this latter compares with other means of performing the same operation.

Turning our attention for a few moments to the question of the repairing shops, let me at once say that the equipment of a shop of this kind can play a very important part towards improving departmental working expenses. In these shops a surprising amount of money can be saved or lost. It all depends on the scope and organization of the shops. I have proved this for myself; and to-day I have no hesitation in saying that a properly laid-out shop is not only an absolute necessity but a sound financial investment. In Croydon our shops are run essentially on the same lines as a manufacturing engineer's workshops. Every operation in the shops is costed, and all job costs scrutinized for financial soundness, &c. In this way we are able to fix the second-hand selling prices of repaired stoves, &c., on an economic basis, and to charge consumers a proper price for repairs to private appliances. We are, also, able to fix an equitable price for all articles made in the shops, such as flue pipe, accessories, &c., and to trap all unprofitable work. We know what certain articles cost to make, and we also know what they cost to purchase; hence we satisfy the needs of the district from the most profitable source.

The maintenance of stoves, boilers, and geysers on the district is controlled by the foreman of the stove shops, under whom a staff of maintenance fitters work. As distinct from revenue fitting work, we find it an advantage to centralize the administration of all maintenance work (other than burner maintenance) at the stove shops. Here stocks of all parts, &c., are always to hand; and if a man finds it impossible to make a satisfactory job of an appliance *in situ*, it can be brought into the shops and repaired there. To reduce unproductive times, these maintenance fitters are provided with cycles. Before any man is sent out on to the district on work of this kind he has a thorough training in the shops in the construction, function, repair, and adjustment of appliances.

With regard to general district work—installations and complaints—our administrative system is as follows: Attached to each district office (there are four, excluding head office) is a resident inspector, who is responsible for all matters on his particular district. Each district inspector has a staff of revenue and complaint fitters to carry-out fitting and complaint work; while he himself acts in an advisory and supervisory capacity, helped by an assistant inspector and foreman fitter. The work of the department, so far as fitting, &c., is concerned, is thus decentralized as far as possible, and loss of remunerative time consequent upon long journeys reduced to the minimum. Each district office and showroom is controlled by a clerk-in-charge (assisted by a junior), who is responsible for all local sales and monies paid in for gas accounts, &c. Each depôt has, in addition, its own storekeeper, and is, therefore, to all intents and purposes the local gas company. At the head office the fitting routine is carried out on much the same lines. Resident at the head office is the chief inspector, whose duty it is to keep in touch with the entire district and to allocate fitters, &c., to any particular district, as work varies in quantity. It may so happen that one district is slack while another has more work than it can cope with. Now by reason of the chief inspector's knowledge of this (he has an outstanding work return each week), he is able to withdraw men from one district to meet the needs of another.

At the head office the district comprised within its fitting (administrative) area is divided into four sections, each under the charge of a sub-inspector, who is assisted by a foreman. Meter reading, testing of meters, and disputed gas accounts is a section of our work which we have found it better to control from the head office only, under the supervision of a meter inspector. The meter inspector is responsible for all matters connected with meters, and has working under him a district assistant, district tester, two shop testers, and, of course, at quarter times the meter-readers. At the head office we have a properly equipped "proving" shop, where all meters brought in from the district are examined and tested. At quarter times the meter inspector requisitions his meter-readers, who are drawn from the fitting and burner maintenance staffs. Every man is carefully tested and certified by the meter inspector as proficient before his name is listed as a meter reader. As an inducement to careful reading, we offer a quarterly bonus of 10s. to each man who has no errors recorded against him. Between quarter times the meter inspector is usually busily engaged in settling disputed accounts and arranging meter exchanges for test. Apart from quarter times—when the assistant meter inspector and district tester are engaged on check reading queried indices—they are employed on the systematic testing of meters *in situ* to detect any cases of meters passing unregistered gas.

With regard to public lighting. We have three foremen in charge of the lamplighting staff who report for duty at the head office and two district offices. In this way the whole of the district is divided into three areas, each under the supervision of a district lighting foreman.

So far as burner maintenance is concerned, this is another section of our work which we have found it policy to decentralize. Attached to each depot are several burner attendants who work under the control of district maintenance foremen, to whom are allocated from head office the work for their districts. The general outdoor supervision of this work is under the care of the general burner maintenance foreman. The staff is encouraged to report all cases of obsolete lighting with which they come in contact, and also to bring in orders for lighting fittings, lamps, &c., which, as I shall show later, they can do, provided they are equipped with fundamental selling data—viz., priced illustrated pamphlets.

By making the burner maintenance men "business getters"—which we have done, and are striving still more to do—maintenance expenses are appreciably eased, and the value of the section enhanced to no mean an extent. I could give you many instances of premises where the lighting was "bad," and people seriously considering the substitution of electricity as the illuminant, that have been reported by our burner attendants, with the result that we have prepared re-lighting schemes, and pointed out the improvements and economies we can effect—qualifying our claims, if they are not at first readily accepted, by fixing up-to-date lamps on approval.

During the period June 1 to Oct. 14 it may interest you to know that my outdoor sections have brought in orders for 543 indoor and outdoor lamps, 40 p.ct. of the aggregate coming from the burner maintenance section.

Do not let anyone say that the burner maintenance section is an unjustifiable expense. It is the only way of holding our lighting business; and if properly administered, its function is not only to maintain and retain business, but also to obtain business, thereby attaining to the success of the undertaking as an indispensable cog in the wheel of progress.

A word or two must suffice in the introduction of the question of transport. Our experience in Croydon has emphasized one point of outstanding importance; and that is the necessity of all deliveries and vehicular accommodation coming under the control of one man and working from a fixed depot. We have running

at Croydon two Thornycroft vans, an auto-carrier, and a Ford light van. One of the two Thornycrofts is employed almost exclusively on the delivery of appliances, and the pressure is relieved at busy times by the other van—which is primarily occupied in the delivery of depot stores and mains and services materials—or else by a hired vehicle. All stove parts are delivered by the auto-carrier and supplied—and, in most cases (where necessary) fixed—by the driver. This has been found a particularly economical method of dealing with stove part renewals, as the hourly running cost (including driver's pay, repairs, depreciation, petrol, &c.) figures-out at only 3s. per hour, in which time he makes, on an average, three calls. Compare this with the wages of the several complaint hands that would otherwise be occupied in taking-out these parts by hand.

The Ford van is used for the rapid transport of mains and service layers to and from various outlying jobs, and also for emergency cases such as "escape at main," "lamp column knocked down," and the like. It is, also, found very useful in the matter of special light deliveries, of which there are a variety occurring throughout the week. All transport is carefully costed and the costs analyzed.

There is another very important section of my department to which I have not yet made reference—viz., the stores and purchasing section. This section purchases all goods for the department's use; and through it are issued all materials connected with the entire work of the district. It supplies the depots with necessary stocks and materials, and all requisitions for goods pass through the stores office which is attached to the general distribution stores at the head office.

The functions of the stores and purchasing section may be broadly stated as: (*a*) That of always being in a position to fulfil the normal wants of the district (in other words the keeping of a requisite stock of essential goods, and of replenishing stocks from time to time), and (*b*) that of buying the right articles at competitive prices.

You will observe that I have laid stress upon three points: (*a*) Normal wants, (*b*) right articles, (*c*) competitive prices. These are the fundamentals of a proper storekeeping and purchasing scheme.

Now let us ask ourselves a simple question. Do we actually know from records—and at a glance—our normal wants? Obviously, if we do not (and there was a time when we did not) we cannot purchase goods in appropriate quantities. We either overstock or keep inadequate supplies. Those using the goods and selling the appliances must be consulted as to their requirements by the person responsible for buying. Lastly, goods bought should conform in "bulk" to an approved sample, which has been submitted to thorough and representative examination and criticism.

With regard to the all-essential side of buying, viz., that of price (in, of course, relation to quality), one must invite tenders for bulk supplies from a selection of firms of repute and obtain samples for careful comparison. It is a good thing for an undertaking when outside firms know that they are in competition for that undertaking's orders. Quantity or bulk plays an important part, as, to use a metaphor, "buying in pennyworths" is an expensive process. A great deal, too, of course, rests with the period of buying and of the replenishment of stocks at opportune times.

As a last consideration of policy, with respect to methods, I come to the mains and services section. Viewing this question from an administrative standpoint, at what must we aim to secure the efficient organization of this section? (1) Centralization. (2) Adequate supervision. (3) Knowledge of costs. (4) Reliable records. The above are, I think, basic answers to this question.

Dealing with (1) Centralization, all main and service laying in Croydon is worked from the head office, and the labour for mains and services allocated therefrom to the various districts, as the urgency of the particular work necessitates. For the purpose of the economical allocation of labour, all mains extensions and new services are reported by the district inspectors at the earliest possible date, so that, as far as possible, a rota of work for certain gangs is prepared well in advance, and stray jobs reduced to the minimum. Relays, &c., are worked-in with new services, &c., as and when the gang is in the neighbourhood.

So far as (2) Supervision, is concerned, the work proceeds under the observation of a mains and services foreman. Daily returns of work done are furnished by the gangers in charge of main-laying, and passed into the office on the following morning, after having been scrutinized by the foreman, so that the progress of a job is always known.

Each main laying job is (under 3) carefully costed; the costing system providing the means for a proper check on the issue, use, and balance of all materials requisitioned for any particular job. Costs are carefully compared, and steps taken to investigate any apparent unjustifiable disparity between similar jobs undertaken by different gangers. It is most essential to have a check on the efficiency of the gangers, and, once again, we resort to our costing system for the "cue."

The last point scheduled for comment (4) is, perhaps, the important one of all. It is most essential to be able to at once tell the exact position of any main, syphon, valve, or special set of connections, &c., not only in cases of emergency (which should always be provided for), but for efficiency of everyday work. Think of the saving in time and reinstatement that is effected by telling the ganger just the right spot in the road at which to open to find a main, be it for an extension, service, repair, or clearance. Again, to lose track of a syphon is a serious matter, and yet many are to my knowledge lost unless properly recorded and regularly pumped. The value, too, of knowing just the spot on which to drop on a valve must be apparent to all. We have been building-up our main records for a long while, and now have machinery in operation whereby the following details are systematically recorded in the office as part of the clerical duties of a distribution department.

(1) Ordnance posting—Each road, &c., has marked on it (in red ink) a line indicating the side of the road on which the main is laid, and the diameter. Each syphon is indicated by a red dot; valves by a cross; and test pipes by "T.P." Important connections, &c., are cross-referenced with the Special Drawing No., and these detailed sketches are filed numerically.

(2) Each road marked up on the Ordnance, as above, is card-indexed and full details of the main endorsed thereon. Syphons, valves, &c., are separately and similarly card-indexed; and whenever a main is exposed, these records are verified.

All information for the above posting is furnished by the gangers by filling in answers to scheduled questions on their work returns.

PART III.—WORKING METHODS.

In the concluding section of this paper the author outlined the office procedure obtaining in his department, giving samples of the index cards and other stationery employed.

Finally, dealing with advertising and publicity, he said: Now that we are again in a position to offer appliances on hire, we hope to resume our pre-war practice of advertising through the local papers. We have, however, found that, by drawing-up our own circulars, widespread publicity is effected if the staff be urged to distribute them in the course of their duties. We believe in having a good display of attractive posters and showcards. We further endeavour to educate our staff in "gas utility" matters by giving lectures and contributing technical and commercial articles in the "Co-Partnership Magazine." It is our aim to reach that state when every employee will be a salesman. All lads entering the service of the Company as fitters' assistants, undergo a special course of tuition at the Polytechnic. What better advertisement is there than an intelligent and efficient workman?

To advertise the advantages of cooking by gas, we arrange, during the summer months, cooking demonstrations in our various districts, using local halls for lectures and small exhibitions of appliances. We also use the lecture hall at our head office for weekly lectures, and fill the room (which will accommodate over 300 people) on almost every occasion. We make it a practice not to force the sale of appliances at these lectures. Any visitor who is interested in any particular appliance is given all the information required, but is not pressed to give an order—a point which is appreciated.

We have two lady advisers for explaining to consumers in their own houses how to get the best results from their gas-stoves. These ladies visit each consumer for whom we have fixed a stove; and we have adopted the policy of notifying consumers that a call is being made on a certain day, if convenient to them—and not asking if the consumer would like an adviser to call. The number of cases in which entry is refused is quite small; and there is no doubt that our consumers are pleased to have the useful hints which are supplied to them.

BUSINESS PUSHING.

We are undertaking, with a gratifying measure of success, the following campaign work:

(A) THE DEVELOPMENT OF THE INDUSTRIAL USES OF GAS.

To attain this end, we have card-indexed all trades. An introductory letter is sent, and reference made to the fact that a representative will be calling in the course of a day or two. Stress is laid upon the efficiency of gas as an industrial fuel; and a request is made that, as a matter of mutual interest, our representative be accorded an interview. The interview takes the form of a general talk, and initial inspection to ascertain what appliances are in use, what processes are undertaken, and whether gas is represented in these processes to the extent it might be. From these basic data, we are able to offer suggestions and submit schemes.

In connection with this matter, we have set aside a portion of our showrooms for the display of industrial appliances. Power has received particular attention. Serious efforts to increase our power load have met with a rather surprising measure of success. A list was prepared of all power users, and letters sent with regard to "gas-engines versus electric motors" in relation to running costs, &c. We undertook to inspect and report upon the condition of any engine free of cost, and, if necessary, to estimate for and carry-out overhauls and repairs. Quite a number of people availed themselves of our offer; and for several months we were busy with engine repairs, &c. We further undertook, at the same time, to examine periodically any engine at an agreed rate for labour only, exclusive of parts; and to-day we have a large number of engine users on our maintenance list.

(B) THE IMPROVEMENT OF OLD LIGHTING INSTALLATIONS.

In this connection all outdoor inspectors and foremen were asked to furnish a list of premises known to be lighted by obsolete means. In this way a list of some 300 premises was compiled. A district representative was deputed to "work" these cases; and

in this manner we have effected some very useful re-lighting work, and saved quite a number of installations which, had it not been for this special treatment, would now be electrical. Special efforts are made in connection with public buildings, such as churches, halls, &c.; and I am glad to say that we are well holding our own in competition with electricity. This is a very important section of our work, and, like the industrial campaign, needs specialized and individual attention.

(c) THE DEVELOPMENT OF COOKING AND WATER-HEATING BUSINESS.

During this summer water-heating and cooking stove campaigns were undertaken, each under the care of a separate representative. Meter readers' cards were referred to, and all houses in the better parts of the district that, to our knowledge, were not using gas for cooking and heating, were recorded in two separate books. Introductory letters in each case were forwarded to the consumer, who was asked to kindly grant our representative an interview when he called. During the war we had, of course, to neglect somewhat our domestic consumers; and we have taken this opportunity of letting them know that we are now in a position to give them more attention.

(D) INTERESTING THE PROFESSIONAL CLASSES.

Periodical campaigns are undertaken among the doctors, dentists, architects, builders, &c., in connection with current matters as interesting them in regard to their particular profession.

Just lately we have sent to the builders and architects details of our "All Gas" kitchen and "Built-in" gas-grates—both of which are being taken up fairly generally on our district, in connection with the large number of new and good-class houses now being erected.

DISCUSSION.

The PRESIDENT (Mr. J. Wesley Whimster) said he was sure the members were very much indebted to Mr. Sandeman for his very valuable paper. When he asked him early in the year if he could give them a paper at this meeting, he (the President) anticipated they would get a good one; and he was sure they had not been disappointed. Mr. Sandeman must have devoted a great deal of time to the preparation of the paper; and he thought they must appreciate his goodness in giving them the full details of his system. These details would be of considerable use to many of them, as they were now re-organizing their distribution departments after the neglect of war time. The paper would be a standing reference on the subject; and, as a paper, the Association must be very proud of having had it. He did not wish to enter into any criticism of the contents of the contribution, because many members present were specialists in this particular department. But one point he should like to make. It appeared from the paper that Mr. Sandeman did not repair his own meters. He should like to know if this was so; and, if so, was it because Mr. Sandeman found it was not a paying proposition? This was a very important point to know; and he should like to have his view. Mr. Goodenough, the Executive Chairman of the British Commercial Gas Association, was present; and he would call upon him to open the discussion.

CONSTRUCTIVE ORGANIZATION.

Mr. F. W. GOODENOUGH said Mr. Whimster had used an expression that was on his own lips to say in regard to Mr. Sandeman's paper—that was, that the whole industry was greatly indebted to him, as it was indebted to all those who put their brains and experience at the disposal of the industry, and who gave, freely and willingly to their colleagues, the amount of time and trouble that had undoubtedly been involved in the preparation of the paper before them. As he had said, they were indebted to those who put their brains and experience at their disposal; and the brains and experience of Mr. Sandeman were of no mean order. He was sure the members would agree with him that the paper was inspired in a marked degree by broad mindedness. The references to the staff alone were quite sufficient to place the paper on a high plane. Mr. Sandeman would agree with him that it was the essence of administration first of all to choose one's staff with care, and with absolute impartiality; and, when chosen, to trust them as fully as prudence permitted—trust them very completely, because it was only by having confidence in a man that one could get the best out of him. Then it would be to the chiefs to help them in every possible way, as Mr. Sandeman had indicated; and then everywhere to make the fullest use of them by seeking their co-operation whenever co-operation could be useful. There was one paragraph in the paper with which he thought they would all feel inclined to disagree, and to ask why the author put it in if he was going to give them the paper. Mr. Sandeman said "do not copy or imitate what somebody else is doing." He (Mr. Goodenough) did not agree with him that everybody should think out everything for himself, and make no use of the experience of others. He certainly thought he had given the lie to his own advice in putting his paper before them that afternoon. In these matters they wanted to save all the time and energy they possibly could in thinking out problems individually in an industry of this magnitude, and to make use of each other's experience, and each other's knowledge, as freely as possible, so as to save themselves going over the same ground many times. He thought, in considering the problem that Mr. Sandeman had put before them, and which he had entitled "The Organization and Administration of the Distribution and Sales Department," he had performed an important service in calling the attention of all administrators in the gas industry to the need for a sales section or department in a gas undertaking, because this was by no means universally recognized. It was still believed that gas would sell itself. When they had got a sales section and department, if they were going most usefully to deal with the subject of organization, they had to divide it up fairly in their minds, and decide exactly whose function it was to look after each section of the problem. They had an object in view—developing sales of gas. They might usefully draw a parallel with undertaking a journey. In such a case they first of all decided the direction in which they were going. That was policy. Then they got the machine that was going to take them. That was organization. Then they provided for the driving of the machine. That was administration. Then they provided for the power which was going to propel the machine. That was inspiration. And, finally, there was the cost of getting there, which was a question of accountancy and costing. Now in regard to policy, it was essentially a matter for the heads of the undertaking—for the chief of the sales department under the board of directors or committee to whom he was responsible. In considering policy and changes of policy, and criticizing policy from time to time by results, the chief would naturally call in consultation his staff, and always ask for suggestions and welcome suggestions from them. Policy was a subject upon which most usefully they should invite and get the co-operation of the staff. When they came to organization, he suggested this was very largely, if not exclusively, a matter for the chief, who, in his (Mr. Goodenough's) opinion, was wise if he obtained expert advice in the matter—organization being an entirely separate thing from any individual business. There was a science of organization. There were experts in organization who had no more to do with a business as a business than an architect who was called in to construct a building in which a business was going to be conducted had to do with the business itself. On the question of organization, his own experience led him to say that one's staff was not necessarily one's best advisers. He was not saying the members of the staff were not very useful in consultation; but it had to be borne in mind, when it was a question of organization, that it was a question of who had to do what, and how it had to be done. Particularly who had to do what. Personal factors affected the judgment of the staff in a way that was not always appreciated. He did think that organization wanted to be laid down from the top, and could not be so usefully made a matter of consultation and discussion as questions of policy. They had got a natural conservative tendency on the part of everyone to do things in the same way as before, and work in the same routine—the same man doing the same work. They had this natural feeling to contend with. New organization meant a re-learning of work, and a re-thinking out of each man's job. He suggested that organization was a matter that should be regarded as a specialist's job, and had not nearly so much to do with the character of the business as had policy, administration, and that great thing, inspiration. When they came to administration, after deciding their policy, after they had agreed as to the machine by which that policy was to be carried out, and came to administration and the active carrying out of the policy, they wanted the co-operation of their staff to the fullest, and to be in constant touch with them. Mr. Sandeman would, he thought, agree with him in that particular. Then they came to the very important point of the education of the staff, because they could not do good work with bad tools, and one of the most pressing problems before the industry for the immediate future was, in his opinion, the proper training of the technical-commercial officials who formed the personnel of the sales or service department. Mr. Sandeman had used the term "service" as applying to this department; and the members knew how particularly keen he (Mr. Goodenough) was on this as the watchword of the commercial side of the industry. Their policy should obviously be to give the most efficient possible service to their consumers at the lowest possible cost. This was the whole object of Mr. Sandeman's paper and of their discussion that day. But, as he said, they could not secure this efficient service if the staff was not thoroughly educated and trained, wisely chosen and trusted, and wisely used. Then, when they came to the question of the driving force which was necessary to carry the machine along, this had to come from the chief himself; and he only wished there were to provide that driving force more chiefs in the industry of the enthusiasm and calibre of Mr. Sandeman. The prospects before the industry if there were sales departments properly organized, properly staffed, and inspired with the spirit of service which animated the writer of the paper—well, it was impossible to calculate what the prospects would be.

B.C.G.A. SPECIALIZING IN ORGANIZATION.

The President was kind enough to call upon him as Chairman of the Executive of the British Commercial Gas Association; and he should just like to indicate the ways in which the Association were trying to assist the industry in regard to the commercial side of its work, apart from its primary function, the big work it was doing in its publicity campaign. They had set up a department which specialized in organization work; and they could put at the disposal of gas managers men whose sole job it was to study organization as a professional thing. "Organization" was separate from policy and administration. He had tried to make it clear that the one thing was quite distinct from the others; and every undertaking had not got a Mr. Sandeman to think out its organization for it. So they had to employ someone who was expert at the work. They wanted to do this, and at the same time to make the fullest use of papers like that of Mr. Sandeman, and so obtain suggestions and hints as to how the work should be done.

FOR EDUCATING THE GAS SALES STAFF.

Then the Association were now thinking-out—by no means an easy problem—an organized scheme for the education of the men engaged on the commercial side of the industry. The Institution of Gas Engineers were preparing an improved scheme for the education of the technical men of the industry; while they of the British Commercial Gas Association were trying to work-out an adequate scheme for the education of the staffs of the distribution and sales department. They would in this particular require the most thorough co-operation of the managers throughout the country, so that, in the matter of salesmanship particularly, tuition could (as it must) come from the industry itself. While they could teach the principles of salesmanship apart from any industry, yet the practical application of these laws to a business must come from within. These were the directions in which they were hoping to be of much greater service to the industry in future than hitherto.

DISPUTES AS AN ASSET.

Now touching upon one or two points of detail, he would like to say that he did not agree with the idea or the plan of treating disputed accounts and meter reading from headquarters, when they had a

staff, as they had at Croydon, of inspectors responsible for all matters each in his own district. He did not see how an inspector could satisfactorily deal with all matters in his own district, and get the fullest possible business out of the district, if the meter reading and particularly disputed accounts were not in his hands. The settlement of disputed accounts was one of the best opportunities for getting increased business that could come to an inspector. It gave him an *entrée* into a house in which he might have tried to get for business purposes for a long time. He had told his staff that a dispute should be regarded as a golden opportunity, and not as a "something" nuisance. [Laughter.] A staff were much inclined, until they got the right idea into their minds, to regard a complaining consumer as a nuisance, or as an enemy. He should be regarded as one who was giving them a chance to go and make friends with him, to cement and improve relations with him if their relations had hitherto been good; or if the relations were bad, to make them good for the future. If he (Mr. Goodenough) was an inspector, he should very much dislike having the settlement of disputes in his district taken out of his hands by headquarters. This was the one serious point of policy upon which he did not agree with his friend Mr. Sandeman. He was not quite sure whether the author agreed with it himself. [Laughter.] There were such things as continuing a policy that had been a policy. To himself consumers' complaints were a valuable asset. And Mr. Sandeman would himself, he was sure, put disputes in the same category.

A HIGH STANDARD, YET DISSATISFACTION.

Then Mr. Sandeman, giving the lines of commercial inquiry, said: "You cannot, I think, do better than ask yourselves these simple questions," the first of which was: "Are you able to cope with all the business you are getting in a prompt and businesslike manner?" He (Mr. Goodenough) was sure that Mr. Sandeman was not satisfied with that. What he liked about the paper was the dissatisfied tone of it. No efficient man was ever satisfied. Every progressive man was always seeking for means of improvement in himself, in his staff, and in his organization. And he was struck as he read the paper with the emphasis laid by the author upon his dissatisfaction with the existing state of things. He was sure Mr. Sandeman would say that the ideal was not merely to cope with the business they were getting, but to get all the business they could, and to cope with the lot. If they could not cope with what they were getting in the normal way, it was no use going out for more. The ideal thing was to cope not only with what business one was securing in the normal way, but with all business that could be obtained by the best application of all methods. The paper would be of great assistance in doing this, and a great inspiration to everyone to go ahead with a progressive policy run by a competent and well-trained staff.

THE BUSINESS-GETTING POWER OF A BROAD POLICY—STATISTICALLY ILLUSTRATED.

Mr. P. G. G. MOON (Bournemouth) said he should like to add his small meed of praise to the excellent paper by Mr. Sandeman. Not only had it been extraordinarily interesting and useful in itself, but not the least of its merits was that it had evoked such interesting talk from Mr. Goodenough. He thought the members would all agree with the soundness of Mr. Sandeman's ideas with regard to district matters, when he emphasized first of all the need for getting the loyal co-operation of everyone on the staff. It was no use having a perfect system without having a staff in accord with the chief, and trying to operate everywhere and in every way for the good of the concern. He was pleased to see this emphasized in the paper. It was the right thing to have such round-table talks as they had at Croydon, and which, from their own experience at Bournemouth, he could readily agree were a fruitful source of inspiration not only to the staff, but highly useful to those in command. Then he thought, too, Mr. Sandeman's insistence upon the critical supervision of one's data was very important. One could easily have a very elaborate system giving all the necessary data that one required; but unless one had properly arranged summaries, so that the business of the district was before one at a glance, the full value of the system was never realized. He was very interested in the author's remarks about watching the percentage of estimates that were accepted. He was not proposing to make comparisons except in the kindest way. They were most fortunate at Bournemouth in that they had a very wealthy class of consumers, which was of material assistance to the Gas Company. Their acceptances varied from 80 to 85 p.ct. of the total estimates sent out. Of course, it was impossible to deal with all the many interesting points that arose on the paper. There were one or two points to which he would take the opportunity to refer. First of all as to burner maintenance. He was sure it was the right thing. Mr. Sandeman charged 2d. per burner. He could not see that there was any effort made to find out how far the 2d. per burner for labour went to meet the actual cost of the labour and attention that was given. The same remark applied to maintenance of water-heaters at 5s. per annum. Their experience at Bournemouth was that it cost more than this. He was not at all suggesting that therefore they should not do it. He thought that as a matter of policy it was quite a good thing to do the maintenance at very reasonable rates. Even if it was not in itself a remunerative operation, it might quite well be advisable to do it a price that would be attractive to the consumer, even if it meant an additional ½d. or 1d. on the price of gas to consumers generally. He took it this was the policy of the Croydon Gas Company. He should like to know if Mr. Sandeman had any idea how it did work out. Then the operating methods at Croydon were in many respects similar to the methods they had adopted at Bournemouth. But he thought that possibly the particular system they had with regard to dealing with fittings for sale was perhaps rather quicker; and, as Mr. Sandeman had emphasized the urgent need for promptly dealing with orders, this question of promptness was of importance. When they read down the "Procedure—Orders System" in the paper, it looked as though a fair amount of time must elapse from the giving of the order until the time it was executed. In their own case they practically did the whole of the work with three cards: The "ascertained" card on which the inspector made his report, measuring-up the amount of pipe and apparatus required, fittings, and so forth. Then on the acceptance of the estimate, the work card was made up direct from the ascertained card; and attached to the work card was a perforated slip bearing the stores order. The work card was handed to the inspector, the stores slip was sent at once to the stores, and the goods were ready for the man the next morning. They found they could go through the ordinary routine, except the estimate, in one day, and have the material delivered to the man by the stores at 8 o'clock next morning. Another thing he should like to ask was, what was the percentage Mr. Sandeman added to the general fittings for sales accounts to cover establishment and profit charges? He took it their general policy should be to keep these added charges to a minimum, because after all they were not out to make large profits from their fittings and apparatus, but to get them on to the district at the cheapest possible cost. He should regard an unduly large profit on the gas apparatus department as being rather bad policy than good policy. In their particular case, they added 25 p.ct. to everything; and this left a profit, besides covering all the expenses of the undertaking. Then as to the summaries of work outstanding, he could say how very useful and how very necessary these were. It was an extremely difficult matter with five or six districts to visualize the progress of work in all of them. The work outstanding summaries were made out so that one could allocate a man from a district that was well up with its work to a district that was behindhand with its work.

VISITORS ASKING FOR GAS-FIRES IN HOTELS AND BOARDING-HOUSES.

With regard to new business, it might interest the members to know what they were doing in Bournemouth on account of its special character. They were doing a very large business in fitting-up gas-fires in hotel and boarding house bedrooms. It was surprising the way in which this work was going ahead. One of the Company's inspectors was taken by a hotel proprietor into his office, and asked to give an estimate for 100 fires. He pointed to a pile of letters, and said there was the reason he was asking for an estimate, because these were inquiries from people who wanted to know if there were gas-fires in the bedrooms. Over 50 p.ct. of the inquirers at this season of the year were asking the question. These were fixed with shilling-in-the-slot meters, at a rate determined between the hotel proprietor and the Company—the ideas of the former on the point being to some extent tempered by the suggestions of the Gas Company. [Laughter.] Another direction in which there was a fruitful field of work was in large cooking apparatus for hotels and boarding houses. There was a tremendous lot of work still to be done in this direction; and it was surprising the number of boarding-houses there were in which it was possible to put any quantity of expensive cooking apparatus with considerable benefit to the proprietors. One other point he should like to ask a question about was as to the payment of commission in encouraging new business. He did not see in the paper any reference to commission. He should like to know if Mr. Sandeman paid commission to his staff, local builders, or house agents. At Bournemouth they paid a commission to any of the staff who brought in new work. They paid any of the local builders, who not necessarily purchased apparatus from them, but who attracted consumers to them, 15 p.ct. on the value of the apparatus purchased. The Company advertised in all the local house agents' registers; but not so much for the sake of the advertisement as for the promises they had from them that they would send in any newcomers' names and addresses. The Company had found this extremely useful.

THE CUSTOM OF NEW HOUSES ANALYZED.

The members could judge of the effect upon the general work if he told them that the total number of houses started in their district in twelve months to date was 648. Out of these 460 were completed. Of the 460, 316 had gas-pipes only, 19 had electric wiring only, and 125 had pipes and wires. They had fixed 336 gas-cookers, 1973 gas-lighting points, and 173 gas-fires. In other words, they had got gas in 441, out of 460 houses, or 96 p.ct. There was electricity in 144, or 31 p.ct. Not even half of the houses—only about one-third of them—were under the Corporation housing scheme. The balance was speculative building. He regarded this result as being largely due to the system of giving commission to the builders. They looked for it; they worked for it; and they pushed the work in the gas company's direction. He also remarked upon the splendid way in which in their case, in common with all gas companies, the slot consumption was growing-up.

GROWTH OF AVERAGE CONSUMPTION.

He noticed that the average consumption per slot consumer had increased from 15,900 c.ft. in 1911 to 26,400 c.ft. in 1920. The average of the ordinary consumers had increased from 33,200 c.ft. to 47,200 c.ft. The average of all consumers had increased from 26,000 c.ft. to 36,000 c.ft.—an increase of 35 p.ct. per consumer over the nine years. This showed the extent to which their commodity was appreciated by the general public; and this, he thought, emphasized Mr. Goodenough's remark that now was the time more than ever when they wanted efficient sales organization.

Mr. GOODENOUGH said it had been suggested that the British Commercial Gas Association might compile a list of hotels and boarding-houses at seaside and other watering-places that had gas-fires in the bedrooms. This list could be published; and it might have a big effect on hotel and boarding-house proprietors without gas-fires. Would it (asked Mr. Goodenough) be a good idea for the Association to write to the manager of the gas undertaking, and ask him to obtain from the hotels a list of those who had gas-fires in their bedrooms? This would give the manager an opportunity of bringing the matter before possible hotel and boarding-house consumers. Or should the Association write direct to the hotels and boarding-houses? The Hotel Belgravia had got 214 gas-fires in the bedrooms; and he could confirm what Mr. Moon had said as to the rapidity with which gas-fires were being put in boarding-houses.

Mr. MOON said he thought it would be an excellent idea if the Association wrote direct to the proprietors themselves. So far as Bournemouth was concerned, if the Association wrote, he would do everything possible locally. He thought it would be a good thing to compile such a list.

The PRESIDENT (referring to a remark made by Mr. Moon) said he

certainly thought this was a paper that could come up for informal discussion round the table at their district meetings. Not one of the speakers had made reference to the valuable data Mr. Sandeman had given them in the bundle of cards and stationery required in connection with the working of the system. These were very useful, and for them they were indebted to Mr. Sandeman and his Company.

Mr. J. PATERSON (Deal) remarked that Mr. Sandeman controlled a large undertaking; some of those present had charge of rather small places, where the organization was not so complete, and could not be. With regard to hotels and boarding-houses with slot meters and fires in bedrooms, he should like to know who paid for the meters—the company or the hotel and boarding-house proprietors? To a small concern, the cost of the meters would be a very serious matter.

Mr. MOON: In the case of bedroom fire installations, the proprietors pay for the fires and cost of fitting, but the meters are rented to them on the ordidary rental basis. The proprietor collects the money from the meters.

REPLY TO THE DISCUSSION.

Mr. SANDEMAN, replying to the discussion, said the reading of the paper and the discussion had taken up so much time of the meeting that he did not feel he ought to stand much longer between the members and Mr. Hoyte, who was reading the next paper. With regard to meter repairs, at Croydon they did not touch them. They had no local meter-testing station; and they sent all their meters away for repair. When the Company had larger general repair shops, they might be able to execute meter repairs; and they would, he was sure, save a lot of money, and the work would be better done. Meters were now very badly repaired, and the work was very costly. As to Mr. Goodenough's remarks, he thanked him for all he had so kindly said concerning the paper. He was sorry, however, that Mr. Goodenough took exception to his remark: "Do not copy or imitate what somebody else is doing." He meant to convey by this that they should not blindly copy others in these matters, but should use their own brains in devising methods of their own, and improving upon what other people were doing." He quite agreed with Mr. Goodenough upon the question of organization, that it was very desirable to have someone from outside to assist them in such work. An outsider often saw more of the game than those who were engaged in it. In one of Sheldon's books it was said that it pays a business man for a time to stand aside from his own business, and look at it from an outsider's point of view. In this, there was a great deal of truth. Mr. Goodenough also took exception to disputed accounts being dealt with at headquarters. He (Mr. Sandeman) agreed entirely with what he said, although apparently this contradicted what he had said in the paper. The disputed accounts were dealt with by the chief meter inspector; but he acted in consultation with the district inspectors.

Mr. GOODENOUGH: And sees the consumer?

Mr. SANDEMAN: Either the one or the other. They did endeavour when settling a dispute to get additional business; and this had been done very successfully in many cases. He agreed with Mr. Goodenough that a disputed account afforded a splendid opportunity for tackling a consumer respecting new business. The great difficulty they had was in getting into consumers' houses. Once they were in, they had a magnificent opportunity of doing further business. He was glad that Mr. Goodenough had said that he gathered from the paper that he (Mr. Sandeman) was not even now satisfied with their methods. He was pleased, indeed, that his friend had obtained such an impression from the paper. He was far from being satisfied with what they were doing. They had to continue to improve their methods if they were going to maintain their position. As to the remarks of Mr. Moon, he was glad to hear that the acceptances of estimates in his case were from 80 to 85 per cent. This was excellent. It depended very largely upon how the work was costed. If the work was being done with a very small margin for overhead charges, it, of course, helped one very much. In his own case he was not satisfied with 65 p.ct. He was out for 75 p.ct., and then his aim would be for 85 p.ct. and onwards. As to burner maintenance, they charged 2d. per burner per visit; but it cost them 3¼d. per burner per visit. On the question of maintenance of water-heaters, they were charging 5s. It cost them 6s. 9¾d. for one visit per annum—that was, with 10 p.ct. on materials, and 15 p.ct. on labour. These were actual costs. Regarding their order system, Mr. Moon considered his method was perhaps a little more expeditious than their own at Croydon. If Mr. Moon read through the paper again, he would see that there was really little in the point. Mr. Moon also asked a question as to the percentage they put on fittings and labour. As to pendants, brackets, and so on, they added 33⅓ p.ct. on the cost.

The PRESIDENT: Does that include overhead charges?

Mr. SANDEMAN replied that it did. With regard to stoves they put 25 p.ct. on cost; and on labour and materials used in fixing, they also put 25 p.ct. Mr. Moon asked a question with regard to commission to the staff. They did pay a small commission to the staff at Croydon, but personally he hated it. He did not like commission at all. It was often very difficult to decide to whom commission was payable. It frequently led to a lot of friction. But anyone who brought in an order for a sale was paid 1s. He did not, however, like it; and he was sorry that he ever introduced it. With regard to builders, they allowed 15 p.ct. on the ordinary price of anything. If they did fitting work for the builders, they charged them 15 p.ct. less than the ordinary price to the public. With regard to house agents, they paid them £1 1s. to £5 5s. per annum to give the Company the names and addresses of the people who were taking houses. Of course, they also advertised in a good many of their registers. He thought he had answered practically all the questions; and it now remained for him to thank the President and the members generally for the kindly way in which the paper had been received. He should be glad to answer any questions that might arise after the meeting regarding the matters dealt with. Before concluding, he should also like to acknowledge his indebtedness to his assistant, Mr. Bishop, for the large amount of work he had rendered in helping him (Mr. Sandeman) to prepare the paper.

The Semet-Solvay and Piette Coke-Oven Company, Ltd., of Sheffield, have prepared a 1922 pocket-book for coke-oven managers which contains a set of tables likely to be of considerable use to those into whose hands the book comes.

A METHOD OF DISTRICT PRESSURE CONTROL.

In last week's "JOURNAL" we printed the paper that Mr. P. S. HOYTE, of Plymouth, read at the meeting of the Southern Association of Gas Engineers and Managers the previous day. We now report the discussion, to which the paper gave rise.

DISCUSSION.

The PRESIDENT (Mr. J. Wesley Whimster, of Bath) said the members were much indebted to Mr. Hoyte for having given them this full explanation of the ingenious apparatus they had devised at Plymouth. When he (the President) heard this new method of pressure control was in operation, he asked Mr. Hoyte if he would give the members a few notes explaining the apparatus; and he kindly said he would do so, and offered to bring a specimen to the meeting. He was sure most of the members would be interested in examining the apparatus after the meeting. Many of them, like himself, had portions of their district in which they had at the works difficulty in knowing when to boost-up, in order to maintain the pressures at these particular points. This was a very important thing to know. Of course, one could get over it by high-pressure governors and a system of high-pressure mains. But they might not be in a position to have these; and where it was a question of low pressures, this should be a most valuable instrument to let them know what they were doing.

Mr. W. T. HOGG (Mitcham) congratulated the author upon solving a problem in which he (the speaker) had been interested a long time. In his Presidential Address to the Association in 1912, Mr. B. R. Green referred to this matter as a long-felt want. In the paper Mr. Hoyte alluded to existing methods. They were not methods; they were muddles. [Laughter.] There was only one real method; and it was a method such as the one described. Mr. Green referred to a transmitter they had devised at Mitcham in which there were a number of glass tubes (fitted on a revolving spindle) filled with mercury. They soon found the mercury oxidized; and regular contact was not made. Sometimes contact was made; and sometimes not. So the apparatus got out of action; and they had devised a totally different method. They had the same type of indicator in the Mitcham valve-room; and it gave continuous indications of the pressure. Now he was in the same position as Mr. Hoyte in not having to fear Christmas or any other time of temporary heavy demand. Mr. Hoyte stated that in the Plymouth apparatus, the gauge was supplied with a time-limit switch which ensured against the possibility of the gauge being inadvertently left in circuit. His own was left in circuit. He supposed that probably Mr. Hoyte got rid of the current too fast. He should like to ask if any trouble was experienced through the oxidizing of the mercury in the trough. It seemed to him (Mr. Hogg) that was rather a serious point. Then he should like to ask whether a recorder could be connected-up so as to get a copy of the record being produced at the district point. He did not say this was necessary; but, if desirable, could it be done? Then he should like to know whether the indicator jumped in tenths or did Mr. Hoyte get a continuous movement, which absolutely synchronized with the other end. He pointed out the need for a metallic circuit, and also alluded to the reference in the paper to the human element. It was a simple thing to fit an indicator to show the pressure at any given point; but they had to depend upon the governor attendant wobbling the governor about. Why not, he asked, have the governor actuated up and down automatically? He congratulated Mr. Hoyte on being in the position he was now in. It was a position he himself appreciated after years and years of trouble. He thought the paper a very suitable one to accompany that of Mr. Sandeman. What was the good of them working to 5 p.ct. of calorific power, if they were going to have 30 to 40 p.ct. variation in the district pressures?

Mr. W. J. SANDEMAN (Croydon) congratulated Mr. Hoyte on what had been done at Plymouth. The author in the paper referred to the question of cost; and he (Mr. Sandeman) must say he was in entire agreement with him. In one of his districts at Croydon, they paid £12 a year to get a record every day of the pressure in that particular part of their district. This had the disadvantage that he got the record twenty-four hours afterwards. He hoped, after talking it over with Mr. Caddick, they would before long get the apparatus installed at Croydon.

Mr. L. J. LANGFORD (Tunbridge Wells) asked whether it was only necessary to fix one of the instruments in a district. He took it they could not fix more to have simultaneous readings, and so it would be necessary to find out which part of the district suffered most from lack of pressure.

Mr. F. W. CROSS (Lea Bridge) said that some little time ago he inquired into this system, and then inquired of the G.P.O. what would be the annual rental charge. The charge made for a line three miles in length was £30 per annum.

Mr. L. A. RUMBLE (Reading) inquired whether the apparatus was actually on the market and, if so, the approximate cost.

Mr. HOYTE, replying to the discussion, said with regard to the remarks of Mr. Hogg, of Mitcham, it was extremely interesting to find somebody else had been working on the same lines; but he sincerely hoped that Mr. Hogg would not accuse him of cribbing his ideas. Before they did anything, they searched in vain the files of the "JOURNAL" for something of the kind. He noticed that at Mitcham they left the gauge in circuit on a twenty-four hour run, but he did not see the object of this, seeing that they were wasting current all the time. At Mitcham he took it they worked off batteries. It was only at the critical hours—such as at cooking times—that one wanted information, and at other times they simply switched-off. In their case at Plymouth, they had no trouble with the mercury oxidizing. They took out the spider once a week, and cleaned the needles if they required any attention. In regard to fixing a recorder, they had one in this case. But they had come to see the uselessness of it; and so they would not continue it much longer. Also in their case the indicator jumps were not continuous. They found that every 2-10ths was quite sufficient. The instrument was graded to show every ⅛ in. between 2 in. and 6 in. There was no object in grading below 2 in., or above 6 in. But they could

have finer or coarser gradations if they wished. He did not know anything about the metallic circuit. The ordinary loop-line served them quite satisfactorily. They were also working on the point regarding the direct connection of the governor to the gauge itself, so that they might load or unload the governor automatically. As to the other point raised with reference to the position of the gauge in the district, in their area it was situated at a critical point at which they had four or five radiating mains, and the gauge was fixed at about the centre of these radiations. They worked to such a pressure that they knew that at the extremes of the mains radiating from the centre, they had a satisfactory pressure. They maintained a pressure of about 28-10ths at the extreme portion of any one of these mains with a pressure of 4½ in. at the gauge; and since they installed the gauge they were able to do this systematically. As to the G.P.O. charges, he did not know on what terms these were made; but the rental charge was not a very formidable thing. He thought the information they obtained from the instrument, if they were in the same difficulties that they were in at Plymouth before the apparatus was started, would be found well worth the money. He might say, as the question had been asked, that the instrument was on the market; and it anyone who desired to do so would communicate with him at Plymouth, he would give them full particulars regarding the matter. He might say that they had received the permission of his Directors to do this. The whole of the instrument on view except one part—the copper metal case (which was made by a firm in Cornwall) was constructed at their own works.

COKE-OVEN MANAGERS' ASSOCIATION.

(MIDLAND SECTION.)

At the Annual General Meeting of the members of the Midland Section of the Coke-Oven Managers' Association, held at Sheffield recently, the newly-elected Chairman of the Section (Mr. J. A. Davy), in the course of his Inaugural Address, referred, says the "Iron and Coal Trades Review," to a paper on "Coke" read by the President of the Association—remarking that in the latter part of his paper the author had said that he believed they would very soon be Americanizing their plants, and made the very broad statement that: "The old idea of compressing coal to produce a hard, dense coke is exploded, and top-charging by mechanical means and mechanical levelling will supersede it." He (the Chairman) did not entirely agree with Mr. Myers on this point, as, with the experience he had with the coke-oven industry in all the coking fields of the United Kingdom, he was of opinion that the compressor was a necessity in some districts, and in such districts had superseded top-loading and levelling, as the latter was the original method of charging ovens—the compressor being necessary to produce a good quality of coke in these areas. However, they certainly might look forward to improvements in coke-ovens; and there was something to be said for the silica brick oven, especially in districts where, through salty coals, the life of the walls was of very short duration. In districts where the life of the walls was anywhere from seven to ten years, the only advantage could be in increased output, consequent upon the higher temperature which was possible through the silica brick, as there was no claim for higher yields of products, but even a doubt as to whether the present yields would be maintained.

As regards sulphate of ammonia, they were all turning out an improved quality as compared with that obtained a few years ago. But it was imperative that they should consider the question of installing plant for making the neutral quality, as this was the standard which they would all have to produce, and would, he thought, be the only quality marketable in a very short time. The trouble had been, not so much the neutralizing, as the provision of a suitable machine for drying and crushing the sulphate. But, as a result of recent experiments on some of the members' plants, there was now a good machine to be had which did this work efficiently, and turned out a very fine product—the neutralizing being carried out either by ammonia alkali or by soda ash.

As to benzole, it was pleasing to note that this product had at last come into its own as a motor spirit. It was now acknowledged superior to any grade of petrol on the market, and in consequence commanded a higher price. They looked forward with interest to results obtained by the Research Committee formed by the National Benzole Association and the University of Leeds for the purpose of carrying out research into the production and use of benzole and its homologues.

Alluding to the fall in prices of all the products manufactured in the coke-oven industry, the speaker remarked that it behoved them as managers, in these tight times, to turn to account all the available resources at their disposal; and to this end they had installed at the Crigglestone plant suitable machinery for the supply of their surplus gas to the neighbouring Corporation of Ossett. This had necessitated the laying of about 4½ miles of gas-main. The scheme was opened-up officially at the beginning of November, and was working very satisfactorily.

ELECTION OF OFFICERS.

The annual ballot resulted as follows:

Chairman.—Mr. J. A. Davy.
Secretary.—Mr. M. E. Nicklin.
Committee.—Messrs. C. P. Finn, G. A. Hebden, P. B. Nicholson, J. W. Lee, J. Marshall, T. B. Smith, F. C. Bishop, and T. H. Riley.
Associate Members on the Committee.—Messrs. W. Green and F. White.
Representatives on the General Council.—Messrs. Davy, Lee, Smith, and Nicklin (*ex-officio*), and Messrs. Finn, Hebden, Nicholson, and Marshall.

GERMAN MANTLE INDUSTRY DURING THE WAR.

The "Journal of the Society of Chemical Industry" (quoting from the "Schweizerische Chemiker-Zeitung") says that, addressing the twenty-second conference of the Deutsche Beleuchtungstechnische Gesellschaft, Dr. Geisel, of the Auer Gesellschaft remarked that in 1910 Germany manufactured 120 million gas-mantles, of which more than one-half was exported. The raw materials employed were almost without exception imported.

When war broke out, supplies of monazite sand sufficient to meet the gas-mantle industry's requirements in thorium and cerium nitrates for ten years were in stock. But there was a deficiency of ramie; and whereas the Auerlichtgesellschaft used a ton of this material daily before the war, in 1918 a daily supply of only 18 kg. was available. Supplies of artificial silk to the same Company amounted to only 80 to 100 kg. in 1918, and finally failed entirely; and resort was then had to paper fibre for mantle manufacture. Such a process of manufacture was beset with difficulties; but these were ultimately overcome, and a mantle was produced in which paper fibre constituted the impregnated material, and which possessed from 60 to 70 p.ct. of the lighting efficiency of the ramie-impregnated mantle. Paper-crêpe was used to strengthen the tops of upright gas mantles; and the difficulties encountered, owing to the failure of supplies of asbestos necessary for drawing the ends together and for supporting the mantle, were overcome by using-up pre-war stocks of short lengths of asbestos fibre, which were formerly regarded as worthless. These supplies being gradually exhausted, iron wire had to be used in place of asbestos fibre, and was found satisfactory under the prevailing conditions of gas supply, as, owing to the smaller flame afforded by the supply of low-grade gas necessitated by the coal shortage, the wire was not subjected to the direct influence of the flame.

In the case of the inverted mantle, the mantle proper was affixed to its supporting magnesite ring by an enamel. During the war, supplies of collodion, camphor, &c., necessary for collodionizing the mantles were available only in very small quantities; and phenol condensation products were used as substitutes. Despite efforts made by other countries during the war to establish a gas-mantle industry, the lecturer anticipated that in a short time Germany would recover her former pre-eminent position in this trade, and remarked that England already experienced great difficulty in preventing the importation of mantles of German origin.

THE "WIZARD" GAS-HEATER.

A neat little gas-heater recently introduced by Messrs. Falk, Stadelman, and Co., Ltd., of Farringdon Road, E.C., is being marketed by them under their registered trade name "Wizard." It is a small portable heater; and the characteristic features of it are that the burner is made on the superheater principle, and

the heating element consists of a specially-designed fireclay body, which produces, after only a few minutes' burning, a very powerful degree of heat. The top can be used for heating water. The illustration shows the heater (which is British made) to be of good appearance.

Books Received.—There have been received for review "The Distribution of Gas" (fourth edition, re-written and greatly enlarged), by Mr. Walter Hole, of Leeds, from Messrs. Benn Bros., Ltd. (price 50s. net); and "The Analysis of Coal and Its Bye-Products," by Mr. S. Roy Illingworth, M.Sc.(Lond.), A.R.C.Sc., F.I.C., assisted by Mr. Jenkyn Griffiths, F.C.S., with a foreword by Sir R. Robertson, K.B.E., F.R.S. (the Government Chemist), from the Colliery Guardian Company, Ltd (price 21s. net).

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

"Nautilus" Coke-Stoves.

SIR,—As a result of the publicity given by you to a coke-stove which was introduced by Mr. F. D. Marshall and is being marketed by the Nautilus Stove Company, Ltd., I was tempted to try one. Personal experience is always the best test; and I am happy to say that the experiment has been unlike some of mine, in that it has been thoroughly satisfactory.

The stove is well made, and is under perfect control. Its scientific design first attracted my attention; and the method of circulating heated air proves wonderfully satisfactory in practice, as the heat is very evenly distributed throughout the room, making it very cosy. There are no smells or fumes from it whatever. Last, but by no means least, I find it costs me under 2s. 6d. a week for fuel, keeping it going night and day; and this incidentally saves a lot of labour in lighting fires, and the dust caused by removal of ashes.

P. SANDFORD.

47, *Victoria Street, Westminster, S.W.* 1.
Dec. 5, 1921.

LEGAL INTELLIGENCE.

CREDITON PUBLIC LIGHTING CONTRACT DISPUTE.

A Question of Costs.

Crediton Urban District Council v. Crediton Gas Company.

In the Chancery Division of the High Court of Justice on Friday last, Mr. Justice Astbury heard an action as to the payment of costs in connection with proceedings brought by the Crediton Urban District Council against the Crediton Gas Company in regard to the public lighting contract. The proceedings in the earlier action were reported in the "JOURNAL" for Dec. 15, 1920, p. 644.

Mr. MICKLEM, K.C., for the plaintiffs, said this was an action for a declaration that a notice given by defendant Company, on March 21, 1919, purporting to determine a contract for the lighting of the public lamps was inoperative and of no effect, and for an injunction restraining them from ceasing to supply gas. The case came before the Court on Dec. 9, 1920, upon motion, and was ordered to stand till the trial, upon defendants undertaking to continue the supply of gas to the public lamps. Since the motion was before the Court, the parties had met and arranged terms for a new contract, without prejudice as to who should pay the costs of the action. The plaintiffs contended that as they were the only parties who had a right to determine the contract they were right in instituting the action, and, consequently, were entitled to the costs; while the defendants contended that the parties should bear their own costs.

His LORDSHIP said, as the parties had come to terms, it seemed only reasonable that there should be no costs.

Mr. MICKLEM said he could not assent to this, as the action had been necessitated by the unwarrantable action of defendants. By an agreement dated March 30, 1909, defendants agreed to supply gas to the public lamps at the rate of 28s. per lamp. Defendants had no power to terminate the agreement, though plaintiffs had the right to do so, and on March 21, 1919, gave notice whereby they purported to determine the agreement as from May 1. During the war, when the lamps could not be lighted, the Council paid the full rate; but after the war, when the price of coal and wages rose, the Gas Company sought to alter the contract.

Mr. LUXMOORE, K.C., for the defendants, said it was only right to say that the defendants offered a rebate while the lamps were not lighted, but the Council declined to accept it.

Mr. MICKLEM said it had been decided by Mr. Justice Lawrence in another case that a gas company were entitled to be paid in such circumstances. The defendants were a statutory Company, and were under an obligation to supply gas. Until the contract was altered by the Court, the Council, as trustees for the ratepayers, were entitled to hold the Company to the contract. The Company took up the position that they were entitled to determine the contract; and the Council had no choice but to bring the action.

Mr. LUXMOORE said defendants had pleaded the Courts Emergency Powers Act, 1919, which was a good defence to the action.

Mr. MICKLEM submitted that in any event plaintiffs were entitled to the costs down to the time when the defence was amended by pleading the Act of 1919.

Mr. LUXMOORE contended that under the Act of 1919 the Court would have annulled the contract; and therefore the question of whether defendants had a right to determine the contract did not arise. As showing that defendants were right in attempting to put an end to the contract, he pointed out that under the new contract the price per lamp had been increased from 28s. to 75s. As to the suggestion that the Company had cut off the gas for several days, he observed that this was not the case, as under the contract the lamps had not to be lighted from May to September; so that the Council had practically six months' notice of defendants' intention to put an end to the contract. Defendants did not ask for costs; but they submitted they should not be ordered to pay plaintiffs' costs.

His LORDSHIP said that, owing to the increased cost of materials, it became impossible for the defendant Company—like other gas undertakings—to continue to supply gas on the old terms; and he thought it was wholly unreasonable on the part of the Council to refuse to enter into negotiations with a view to amending the terms of the contract. At the time the writ was issued, he thought both parties were in the wrong—the defendants by seeking to put an end to the contract without applying to the Court for relief under the Act of 1919, and the Council by continuing the proceedings after the defence had been amended by pleading the Act of 1919. Fortunately the parties had compromised their differences; and the only question to be decided now was who was to pay the costs. On the whole, he thought plaintiffs were entitled to some costs. After the defence was amended, plaintiffs ought not to have proceeded with the action. He thought justice would be done by ordering defendants to pay the costs down to, and including, the date when the defence was amended; and there would be no order as to costs from that date.

An Irish Gas-Works Site.

The High Court of Appeal in Ireland had before them an appeal from a King's Bench decision on a case stated in regard to land on which the Ballynahinch (co. Down) Gas-Works were erected. The Company held under a proposal of October, 1875, made to a Mr. D. A. Ker, who was then tenant for life of the Ker estate, of which the land formed part. Mr. Ker approved the proposal, and granted a lease for 99 years; the letting to be determined should the place cease to be used as a gas-works. Mr. Justice Gibson had dissented in the King's Bench from the affirmative answers given by the majority; his opinion being that the proposal was not a concluded contract, as it contained a further term as to covenants usual upon the estate. The Court of Appeal now held that there was no contract; and that, if there was, it was a contract for an executory lease, and not a contract for a demise. The King's Bench decision was accordingly reversed.

REGISTER OF PATENTS.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for Nov. 30.]

Nos. 30,996 to 31,774.

AIRD, K.—"Atmospheric gas-burners." No. 31,494.
BARNES, J. E. L.—"Securing intimate contact of liquids and gases." No. 31,324.
BLAKELEY, W.—"Valve mechanism for gasholders, &c." No. 31,445.
BLAND LIGHT SYNDICATE, LTD.—"Incandescent gas-burners." No. 31,063.
CHADWICK, G.—"Gas-generator." No. 31,700.
COLORADO IRON WORKS COMPANY.—See Barnes. No. 31,324.
CONIBEAR, S.—"Gas-saver." No. 31,601.
COWAN, S.—"Thimbles or ferrules for repairing mains." No. 31,002.
CROSS, L. H.—"Lamps for lighting." No. 31,202.
DREW, E. S.—"Production of gases." No. 31,714.
EGGINGTON, W. H.—"Gas-taps." No. 31,236.
ELMS, R.—"Locking-devices for taps, cocks, &c." No. 31,348.
GARBARINI, A.—"Gas heating radiators." No. 31,097.
GOAD, F. L.—"Safety-device for coin-freed mechanism." No. 31,381.
HERSEY, S.—"Machine for disintegrating oxide of iron, &c." No. 31,393.
HIBBERD, C. E.—See Goad. No. 31,381.
HOOPER, E.—"Liquid-measuring apparatus." No. 31,153.
LAIDLAW, A. B. S.—"Production of gases." No. 31,714.
LAWLEY, E.—"Gas-retort stoking-machines." No. 31,650.
LUCAS, H.—See Eggington. No. 31,236.
NORMANSELL, F. W.—See Eggington. No. 31,236.
NUTHALL, S.—"Systems of artificial illumination." No. 31,741.
PUDNEY, F.—"Gas-burners for heating and lighting." No. 31,351.
ROGERS, R. J.—See Bland. No. 31,063.
SOC. ANON. DE PROGRÈS INDUSTRIEL.—"Tapping machines." No. 31,028.
SPENCER, E. F.—"Valve-mechanism for water-heaters." No. 31,058.
STOKES CASTINGS, LTD.—See Hersey. No. 31,393.
STOKES, F. W.—See Hersey. No. 31,393.
SUTTCLIFFE, J.—"Removable plug for liquid taps." No. 31,603.
SUTTON, C. J.—"Boxes for inverted gas mantles." No. 31,433.
TRASK, W. E. J.—"Gas-volume slide-disk." No. 30,997.
VICKERS, LTD.—See Goad. No. 31,381.
WEYMAN, J. E.—See Hooper. No. 31,153.
WORTLEY, G. W.—See Aird. No. 31,494.

Price of Gas at Dudley.—The Dudley Gas Company have been again approached by a Committee of the Corporation with the object of securing a reduction in the price charged for gas, which is 5s. 6d. per 1000 c.ft. The Directors, in their reply, express regret at their inability to reduce the price at present, in view of the fact that there has been practically no reduction in the price of coal for gas making, and that the Company have suffered loss of revenue from the sale of residuals. The Committee have appointed a deputation to wait upon the Directors with a view to securing a reduction in price.

An Irish Gas Boycott.—A curious situation has arisen at Wicklow, where, under municipal auspices, a boycott of the gas supply was inaugurated last week as a protest against the price (which is 12s. 6d. per 1000 c.ft.), and the refusal of a demand for a reduction to 7s. 6d. Full pressure is maintained by the Gas Company; but tradesmen and private users refrain from using the gas, and corn mills and printing works assume a like attitude. On the other hand, the military and police barracks, the infirmary, and the post office use it; and at the quay and harbour lighting is maintained. The Company say they cannot make a reduction in price at present.

MISCELLANEOUS NEWS.

TAXING FOREIGN GAS-MANTLES.

Application under the Safeguarding of Industries Act.

Mr. Cyril Atkinson, K.C., who has been appointed Referee under Part I. of the Safeguarding of Industries Act to hear complaints as to inclusions in, or exclusions from, lists of goods published by the Board of Trade under the Schedule to the Act, on Saturday last, began the hearing of a complaint with regard to gas-mantles. The application is by the British Association of Incandescent Gas-Mantle Manufacturers and by the nitrate of thorium manufacturers in this country, who claim that gas-mantles should be included in the list of taxable articles published by the Board of Trade. The National Gas Council opposed the application, as did also the Board of Trade.

Mr. TERRELL, K.C., and Mr. A. M. LATTER appeared for the British Association of Incandescent Mantle Manufacturers; Sir ARTHUR COLEFAX, K.C., and Mr. TREVORS WATSON for the nitrate of thorium manufacturers; Mr. J. HUNTER GRAY, K.C., and Mr. JACQUES ABADY appeared for the National Gas Council; and the Board of Trade were represented by Mr. WHITEHEAD, barrister.

Mr. TERRELL, in stating the general case for the complainants, pointed out that in the schedule to the Act it was expressly stated that among the articles which were to be subjected to the one-third duty under Part I. of the Act were thorium, cerium, and other rare earth metals; and the contention he was going to put forward was that gas-mantles came within the meaning of those words, and therefore should have been included in the list which the Board of Trade had published. He then briefly stated the history of the gas-mantle and gave a rough outline of the method of its manufacture. The shaped fabric was dipped into a solution consisting of 99 p.ct. of thorium and 1 p.ct. of cerium. The fabric only served the purpose of giving shape to the mantle, and in the finished state the mantle was a compound of thorium and cerium oxide. Finally, when the finished mantle was put on to a burner and burned-off, as was so well known, it remained a compound of nitrate of thorium and nitrate of cerium; the fabric and the collodion having disappeared. In this state it was contended that the mantle was an anhydrous oxide of thorium, which was in the list which the Board of Trade had published. Mantles were also made in a form in which they were not burned-off by the makers, but were sold to the public with the fabric still existing; the burning-off in that case taking place when the mantles were put on to the burner. This latter class of mantle was usually made of artificial silk or ramie. With these exceptions the mantles were exactly the same as he had described, and also came within the claim that he had made. The latter class of mantle contained the nitrate of thorium in a dried form; and nitrate of thorium and nitrate of cerium were both in the list, as well as the salts and compounds of thorium and cerium. Nitrate of thorium and nitrate of cerium were used for no other purpose than for making incandescent gas-mantles, except to a very slight extent in the manufacture of tungsten wire electric incandescent lamps and for laboratory purposes. Therefore he claimed that it must have been the intention of the Legislature to include gas-mantles when specifying nitrate of thorium and nitrate of cerium. It was one of the points which the Referee would have to consider, whether a gas-mantle, which was a compound of nitrate of thorium and nitrate of cerium with a little piece of asbestos and traces of magnesia and alumina and treated with collodion, was taxable. In the case of the mantle which was not burned-off before distribution to the customer, there was no collodion, because the mantle was strong enough for transport without it; but that was the only use of the collodion, which had no effect upon the light-giving properties of the mantle and disappeared when the burner was lighted. Passing to a consideration of the Safeguarding of Industries Act, Mr. Terrell said he thought it would be agreed by all lawyers that an Act of Parliament must be construed according to its intention as gathered from its words—that they could not import into the Act anything that was said or done or spoken as the opinion of people before the passing of the Act. From a reading of the Act, it was obvious that the Legislature intended to safeguard certain special industries on the one hand, and also to protect them against the effects of the depreciation of foreign currencies. Apart from this, the safeguarding of industries was intended to cover certain key industries. There had been a great many definitions of the term "key" industries; but he was inclined to think that the best definition was that of capital industries producing material for a large number of other industries. It would be a matter for the Referee to consider whether the whole of the gas-mantles as delivered into this country were chargeable with the duty, or whether the duty would have to be on that portion of the mantle which represented the nitrate of thorium and the nitrate of cerium. Passing to the schedule to the Act which specified the goods chargeable with duty, Counsel pointed out that there were nine sections in it, and that section 8 reads: "Metallic tungsten, ferro-tungsten, and manufactured products of metallic tungsten, and compounds (not including ores or minerals) of thorium, cerium, and other rare earth metals." It would be necessary for the Referee to put a construction on the meaning of the word "compound;" and he was going to suggest that a compound might be a chemical compound—*i.e.*, the things of which it was compounded entered into chemical combination, or it might be a mechanical mixture which was not in chemical combination, but was intimately mixed. On the other hand, a compound might be an article part of which consisted of a dutiable article. He submitted that the word "compound," as used in the Act, included all three of these definitions.

The REFEREE asked Mr. Terrell if he read the part of the schedule in question as meaning "compounds of thorium, compounds of cerium . . . ."

Mr. TERRELL said that was so; otherwise it would mean compounds of thorium, and then cerium alone. It must mean compounds of both, or of them and other rare earth metals. Continuing, and reading the last section of the schedule, which relates to chemicals, Counsel suggested that in connection with this case it would also be necessary to define the words "fine chemicals." "Fine chemical" indicated great purity; and if ever there was an industry in which purity was essential in the ingredients, it was the gas-mantle industry. One-tenth per cent. impurity in the nitrate of thorium was fatal. He therefore submitted that nitrate of thorium and nitrate of cerium came within the term "fine chemicals."

The REFEREE said he would like Mr. Terrell's definition of a chemical.

Mr. TERRELL said it was a very difficult task. He could only define it as something which had a chemical reaction; and everything had a chemical reaction provided it was brought under proper conditions.

Sir ARTHUR COLEFAX suggested that this was hardly a relevant matter at the moment.

Mr. TERRELL agreed, and said that the real trouble was in defining the word "fine." Nitrate of thorium, he submitted, was a fine chemical; and if he was right in that contention, then the Referee had got to put a meaning of the words "Compound of thorium . . ." in the schedule. In these mantles there was undoubtedly a compound of thorium and cerium, whether it was a chemical compound or a mixture. This took him to section 1 sub-section (4) of the Act, which read: "Where an article is a compound article of which an article liable to duty under this section is an ingredient or forms part, no duty shall be charged under this section in respect of the compound article if the compound is of such a nature that the article liable to duty has lost its identity; and any dispute as to whether an article has lost its identity shall be determined in like manner as disputes as to whether goods are goods specified in the Schedule to this Act." It was necessary to take into account the words "ingredient or forms part of;" and he submitted that they confirmed his submission as to the meaning of the word compound, because "forms part of" must be treated differently from "ingredient." Then there came the question of the meaning of the words "lost its identity." In this case, what they had to consider was whether the oxide of thorium or oxide of cerium had lost its identity; but it would be childish to suggest that they had. They were still there in the finished mantle. This section meant that the substance must have lost its identity chemically and was no longer the same; and they could not say that in regard to a mantle. There was very little else in the mantle than oxide of thorium and oxide of cerium; and it could not be the intention, in any event, of the Legislature to put on the Customs the duty of analyzing everything that came into the country to find out whether there was any thorium or not, then to sort out the thorium and find out the percentage, and afterwards calculate the duty on that percentage.

The REFEREE asked what was the practice of the Customs in the case of an article in which the dutiable portion was a very small one indeed.

Mr. WHITEHEAD said he was instructed that it was the invariable practice of the Customs to charge only on the dutiable ingredient, and not on the whole article.

Mr. TERRELL said that must be proved. His contention was that the mantle as a whole was liable to duty, because under section 1 (4) the duty had to be charged if the ingredient had not lost its identity. Mantles were articles which, in substance, were compounds of thorium and cerium. The intention of the Act was to protect certain industries; and it would be given in evidence that if there was no manufacture of thorium mantles in this country, then not only would that industry be injured but there would also be no manufacture of thorium salts, which was another industry allied with it. That would be the case if it was held that mantles did not come within the schedule; and he could not conceive it otherwise than as being the intention of the Legislature to protect the gas-mantle industry, because they were the only things that were made from compounds of thorium and cerium.

The REFEREE said he could not appreciate the argument that the duty should be levied on the whole article where it consisted in part of a taxable ingredient.

Mr. TERRELL, taking the analogy of the knife, said the tax would have to be on the blades, leaving the handle out; but in the case of mantles, the other materials were so small that they would not be worth talking about. They could not, in the case of knives, levy the duty on so many ounces of chromium in the blades. If the intention of the Act was to protect industry, it would protect no industry unless they took that view of it.

The REFEREE asked if it were thought possible to get out of paying the tax if the solution of nitrate of thorium was sent here soaked in sponges.

Mr. TERRELL said the Act provided that the value of the goods was to be that which an importer would pay for them as goods; and in this case the nitrate of thorium was only useful as goods when made up into mantles.

Mr. *H. Ballantyne*, Vice-President of the Institute of Chemistry and Consulting Chemist to the Welsbach Company, said he had examined several imported mantles from Germany, Italy, Poland, Austria, and the United States; but as the industry of gas-mantle making was conducted upon more or less secret processes, he did not wish to say too much about the details. The varying particles of monazite sand had varying compositions. One particle might be oxide of titanium, another ordinary quartz or silica, another ilmenite, which, chemically speaking, was a compound of oxide of titanium and oxide of iron; another particle would be garnet, which was a very complex silicate; another would be xenotime; another yttrium; another zircon, and so on. None of the particles consisted of the chemical compound thorium; but there were particles which had associated in them some phosphate of thorium. The sand was subjected to a process of concentration which rejected the useless material, and the residue was usually from 5 to 8 p.ct. of thorium oxide. This was first treated with sulphuric acid, which decomposed it chemically and reduced it to a solution, and a great many compounds of thorium and cerium came off which were soluble in water. This solution was put through a number of processes to eliminate the impurities, and ultimately a solution of thorium salt was obtained which was of a very high degree of purity. It was usually a nitrate. This solution was evaporated down to a solid

product, which was then pulverized into a white powder. The chemical formula for it was Th $(NO_3)_4$; and it contained 48 p.ct. reckoned as ThO_2 or oxide. He would certainly describe the salts of thorium which were produced as a fine chemial, owing to the very high degree of purity which was required. Salts of cerium must also have a very high degree of purity. Excluding the very small quantities of thorium nitrate used for scientific purposes, there was practically no other use for it than for the making of mantles, although he believed a small quantity was employed in connection with tungsten filaments of electric incandescent lamps. Many of the compounds of thorium given in the Board of Trade list he had never seen. The fabric of a mantle was simply a means of holding the thorium and cerium together, because both could be recovered from the fabric in water. He regarded the mixture of thorium and cerium in a mantle as a physical mixture, although it had not yet been fully investigated. They could be separated quite easily.

Mr. GRAY cross-examined for the National Gas Council. It was put to Mr. Ballantyne that there were many more things in a mantle than merely thorium and cerium. Witness replied that the quantities were extremely small. Counsel, however, asked him to disregard the quantities for the moment. For instance, the majority of mantles were branded, and for this, the rare earth didymium was used. There was also often in the impregnating solution some beryllium nitrate; and summing the list up, Counsel said that the mantle contained collodion, asbestos, thorium oxide, cerium oxide, magnesium, didymium oxide, beryllium oxide, ash and alumina.

Witness agreed, but again added that the quantities were extremely small. In answer to further questions, he said that the thorium oxide represented about 75 p ct. of the total weight of the mantle. He would call a mixture of thorium oxide and cerium oxide a fine chemical, undoubtedly. It was necessary to mix the two together; and they had to be very pure indeed. He agreed, however, that a substance might be a fine chemical for one purpose and not for another. He understood that several definitions of a fine chemical had been put before the Referee; but he thought a better one could be put forward. At the same time he did not wish to give it now, as certain patent proceedings were pending in which it would have to be given. The definition of a fine chemical must have relation to purity and the skill required in making it. It must also be prepared or manufactured and refined, and must require highly skilled labour in its production to such an extent that labour and supervision were a substantial element in the price. The combination of thorium and cerium had been known for years as thoria-ceria.

Cross-examined by Mr. WHITEHEAD, for the Board of Trade, witness said he would never refer to a compound as a substance of a definite chemical composition, not even before the passing of the Act. Chemists talked continually of compounds when they meant mixtures, but generally a compound meant to a chemist a mixture of compounds. There was always, in the mind of a chemist, a difference between a mixture and a compound. As to the loss of identity, there was little doubt that the thorium and cerium did not lose their identity in the mantle, because they could both be recovered from it in about two hours. He had examined a mantle from Poland, and found that the thorium represented 70 p.ct. of the total weight, cerium 0·7 p.ct., and the remainder represented the other things which had been mentioned. The ash was infinitesimal.

After the luncheon adjournment, Mr. Whitehead called a witness to support his statement as to the practice of the Customs.

Mr. *Charles Bedford Grylls*, Assistant Secretary of the Customs and Excise Department, said it was the practice to levy the duty on the dutiable ingredient only. The Customs had not yet had to deal with gas-mantles.

Mr. TERRELL said that might be so; but this evidence was no aid in construing the Act. It might be that the practice at present adopted was all wrong. He asked witness if, when during the war the export of thorium oxide and cerium oxide was prohibited, gas-mantles were also prohibited.

Witness said he could not answer the question. In the case of gas-mantles, he would try to get at the value of the thorium as it was ready to be put into the mantle, and levy the duty on that.

Sir ARTHUR COLEFAX put it to witness that, in the list of articles prohibited from export before the Sankey judgment, gas-mantles were included.

Witness replied that he could not say why.

Sir ARTHUR COLEFAX referred to other Proclamations relating to export in which gas-mantles were mentioned, in addition to thorium oxide and cerium oxide.

Witness said he could give no assistance on the matter.

Mr. *C. S. Garland*, Managing-Director of Lighting Trades, Ltd., and a Vice-President of the Society of Chemical Industry, said he had been engaged in the manufacture of mantles for eleven or twelve years. If German competition was allowed to go on, he was afraid that the mantle industry in this country would come to an end, and with it the thorium nitrate industry.

Mr. GRAY got from witness that he was an active member of a Committee of the incandescent gas-mantle trade, which, during the passing of the Safeguarding of Industries Bill, endeavoured to secure the insertion of gas-mantles in the Bill. The object of this was to counteract efforts that were being made to have them expressly excluded from the Bill.

Witness also agreed that an endeavour had been made to get gas-mantles included in the terms of the financial resolutions in the House of Commons upon which the Bill was framed.

Mr. GRAY was proceeding to refer to speeches in the House of Commons when Mr. Terrell objected. Eventually, the Referee allowed the references to be made; and Mr. Gray pointing out that it was open for the Referee to dismiss the whole point, if he thought fit.

Witness, answering further questions in this connection, said there was at the time very strong agitation by importers to get mantles definitely excluded from the schedule, and every possible step was taken by the manufacturers here to bring their case before Members of Parliament.

Mr. GRAY pointed out that in the discussion on the financial resolutions in the House of Commons, the President of the Board of Trade specially mentioned that gas-mantles were not included in the schedule because the manufacturers here were making large profits, and could look after themselves.

Witness said he had not heard of those speeches, although if reported in Hansard they must have been made; but the fact was at present firms were not making profits. He believed the idea at that time that large profits were being made was due to the fact that the shares of one company went up from 12s. 6d. to £3. Continuing, he said he doubted whether a one-third tax would be sufficient to protect the industry at the present time; but there were other provisions for dealing with the situation which together might save the industry. It was contemplated taking action under Part II. of the Act, which dealt with dumping. Apart from that, a tax of 66 2-3rds would about put the position right. The English wholesale price of mantles to-day was 60s. per gross. The price in Germany of a mantle was 5 marks 15 pf.; and with the mark at about 1000 to the sovereign, this represented 15s. per gross. This was the internal price. The Germans had a very strong Association which endeavoured to keep up the price in the export market, and to-day the export price of German mantles was from 36s. to 38s. per gross.

The REFEREE: No wonder you do not do much business.

Witness: We do not, I assure you.

Sir ARTHUR COLEFAX then called a witness on behalf of the nitrate of thorium manufacturers in this country.

Mr. *Edmund White*, Managing Director of Thorium, Ltd., confirmed the previous evidence as to the almost sole use of thorium nitrate and cerium nitrate for the purpose of manufacturing gas-mantles. During the ten years he had been in business he had only sold about 10 kilos. for other purposes. Owing to the competition of foreign gas-mantles, he had now accumulated a large stock of nitrate of thorium of which he had been endeavouring (unsuccessfully, so far) to get rid. His works were laid out for an annual output of from 40,000 to 50,000 kilos.; but the present output was only about 20,000 kilos., and steps were being taken to reduce this.

Mr. GRAY, in his cross-examination, suggested several other markets for thorium nitrate, such as in connection with electric lamps, for flash light batteries, and for catalysts.

Witness said he was not aware that there were such markets, and they must be extremely small ones.

Mr. WHITEHEAD cross-examined at some length as to the chemist's view of a compound, but witness would not accept the view that a compound meant only a substance in which the ingredients were in chemical combination.

This closed the case for the complainants.

Mr. GRAY, addressing the Referee on behalf of the National Gas Council, submitted that there was no possible doubt that gas-mantles were actually and expressly excluded from the schedule. His first point was that as mantles were not included in the schedule, therefore they could not be put into any list. The first point he wished to draw attention to was that gas-mantles were notoriously articles of great commercial importance; and the National Gas Council, for whom he appeared, represented all the substantial gas industries of the country and about 90 p.ct. of the undertakings, whether company or municipal. The point which it was desired to put forward was that it would be detrimental to the users of mantles in this country that a tax of one-third should be put upon foreign mantles, as it would result in an inevitable increase in price. Coming to the financial resolutions in the House of Commons prior to the presentation of the Bill, he contended that gas-mantles were expressly excluded, as the terms of the resolutions were exactly the same as the schedule to the Act as it was finally passed. An Act could not contain anything which was not referred to in the financial resolutions relating to it. He claimed the right to refer to what the Chancellor of the Exchequer said on that occasion; and it would be seen that gas-mantles were intended to be expressly excluded. The reason given was, as he had mentioned in cross-examination, that the gas-mantle industry in this country was making large profits and could look after itself. Counsel referred to certain legal precedents in support of his contention that it was essential to look at what was in the minds of representatives of the Government prior to the passing of an Act, in attempting to construe an Act of Parliament. If they looked at the schedule to the Act, it would be seen that it stated "metallic tungsten, ferro-tungsten, and manufactured products of metallic tungsten;" but in the same section referring to thorium and cerium it did not say "manufactured products"—it merely said "compounds (not including ores or minerals) of thorium, cerium, and the other rare earth metals." In the one case, there was a specific mention of articles manufactured from the raw materials previously stated, and in the second case there was not. Consequently, as it could not be denied that a gas-mantle was a manufactured article from the raw materials thorium and cerium, the mantle, as such, did not come within the schedule, and therefore could not be included in the list by the Board of Trade. Further, he contended that the expression "compounds of thorium and cerium" meant true chemical compounds and nothing else. It was clear that the whole of that part of the schedule, at any rate, was addressed to the chemist—indeed, it might be said that the whole of it was. For instance, beakers and burettes were mentioned; but they were not terms in use by the ordinary public. There was little doubt in his mind that compounds of thorium and cerium, as mentioned in the schedule, came within the definition of raw materials. It had been suggested that the gas-mantle industry in this country would be killed if the tax was not imposed; but he suggested that it was not a fair way to put it. As he had already said, it was due to the fact that the industry was making large profits when the Act was passed that gas-mantles were not included in the schedule. At the same time, it was thought necessary to encourage the industry by not taxing the raw materials. There was no tax on monazite sand; and he did not believe the Referee would accept the sweeping statement that both the gas-mantle and the thorium nitrate industries in this country would be killed. In any case it was clear that what they had to consider was the intention of the Act, without regard to the consequences. Nobody could suggest that thorium and cerium alone could make a gas-mantle—they were merely links in the chain. The thorium nitrate, as such, in the mantle might be taxable, but not the mantle as such.

Mr. WHITEHEAD said he agreed with that submission.

Mr. GRAY said it was not really for him to say whether the thorium and cerium in the mantle were taxable. That was a matter for the Board of Trade. The only real point that he had to deal with in this case was whether or not gas-mantles came within the schedule; and it was clear to him that they did not, and therefore could not come within the list.

The REFEREE said the point was whether thorium and cerium were or were not dutiable when they became part of a mantle.

Mr. GRAY said this was not the point. The case of the complainants was that the mention of compounds of thorium and cerium in the schedule expressly included gas-mantles; and that was the only point the Referee had to consider—he was not concerned with the consequences. He would only be getting into further difficulties if he looked at other sections of the Act to find out what part of the article should be taxed. It was unthinkable to him, if the Legislature intended to include gas-mantles, that they did not include them in specific terms having regard to what had taken place in connection with them on account of the introduction of the Bill in the House of Commons.

Mr. TERRELL, for the complainants, said there were legal authorities for his contention that in construing an Act of Parliament it was permissible only to look at the Act itself, and not to anything said in connection with it in either the financial resolutions or anything else.

Mr. WHITEHEAD, speaking on behalf of the Board of Trade, said he did not propose to ask the Referee to look outside the Act of Parliament, but merely to look at the indicating words in the schedule itself. The only issue raised by the complainants was that the schedule was intended to include gas-mantles, and, in consequence, in any list prepared by the Board of Trade. There was no compulsion on the Board of Trade to issue a list; but they had chosen to do so. If they had not, then the complainant swould have had to take similar proceedings to these in regard to the Customs, which were provided for in the Act. The Board of Trade could not put into the list anything not indicated in the schedule. Gas-mantles, however, were not expressly mentioned in the schedule. Moreover, he read the schedule to mean that the taxable article was not a compound of thorium and cerium, but compounds of thorium and compounds of cerium, which were separate things. A gas-mantle was, if anything, a compound of thorium and cerium, and therefore was neither thorium nor cerium alone. If the Legislature had intended to tax a compound of thorium and cerium, it would have said so. Not only did Parliament refrain from putting gas-mantles in the schedule; but it also refrained from mentioning the well-known thoria-ceria, which Mr. Ballantyne had said was a common expression in the trade. Therefore he submitted that the Board of Trade was correct in construing the schedule in the way it had, and that gas-mantles ought not to be in the list.

The inquiry was then adjourned until Monday.

Monday, Dec. 5.

On the resumption of the proceedings to-day,

Mr. *S. S. Ogilvie*, Joint Manager of the National Gas Council, was called to give evidence as to the scope of that body, which represented 97 p.ct. of all the gas undertakings in the country, both company and municipal. Any tax upon imported gas-mantles would be a serious thing from the point of view of public lighting, and even more serious from the point of view of the working classes, who used gas-mantles so largely, and in a greater proportion than other classes. Moreover, gas lighting was experiencing severe competition from electricity for lighting, and any increase in the price of mantles would make the competition the more severe.

Answering Mr. TERRELL, witness said that the Council consisted of an Executive of 44, with an Emergency Committee of 11, who had dealt with this particular matter and would report to the Executive in due course. The Gas Light and Coke Company had one representative on the Council; and Mr. Milne Watson, the Governor of the Company, was President of the Council. The Manchester Corporation were represented on the Council by Alderman Kay, the late Lord Mayor; but he did not attend the meeting of the Emergency Committee who dealt with this matter. Mr. Bond, of the Southport Corporation, was, however, present. [Counsel was endeavouring to show that the National Gas Council consisted largely of companies.]

Mr. TERRELL also put it that the large corporations stipulated that the mantles which they used should be of British manufacture.

Witness said he was not aware of this, and would be surprised if it were so.

With regard to the Gas Light and Coke Company, witness said he had been told that the Company obtained large numbers of mantles from abroad; but it had been specifically denied in the House of Commons that the Company were interested in the "Nico Company." He did not know whether there was an English company whose mantles were made in Belgium. The Gas Light and Coke Company obtained their mantles from all over the world.

Mr. TERRELL asked whether it was a fact that the Gas Light and Coke Company got mantles from Germany and elsewhere cheaply and sold them at the English prices.

Witness said he did not know that this was done.

Sir ARTHUR COLEFAX (for the thorium nitrate manufacturers): What is your evidence?

Witness said it was to show the scope of the National Gas Council and the large interests which it represented.

Sir ARTHUR COLEFAX: But I could have said, just as you have, that an increase in the price of mantles would hurt the working classes.

Witness: But it would not have been evidence.

In re-examination, witness said that although it might be the practice for some municipalities to stipulate British mantles for their public lighting, they could not stipulate that their consumers should use British mantles which were so much dearer.

This closed the case for the National Gas Council; but there was a little discussion between the Referee and Mr. Gray.

The REFEREE said he understood the case put forward by Mr. Gray was that a mantle was a manufactured article of thorium and cerium, and that as the Act did not specify manufactured articles, as in the case of tungsten, it did not include gas-mantles.

Mr. GRAY agreed. That, in his view, was the only point; and he did not see that the Referee had anything to do with the question of whether the thorium and cerium as such should be taxed or with the question of whether or not they lost their identity in the mantle.

The REFEREE said the Board of Trade had come to the decision that the Act did not cover thorium and cerium as contained in a gas-mantle, but only when they were not in that form.

Mr. GRAY said he was not aware of what the Board had done on that point; but in any case he submitted that it did not affect the question before the Referee now.

The REFEREE: The case for the Board of Trade is that mantles are not taxable at all. Have I not power to say that some words should be put in to indicate that the thorium and cerium in a mantle should be taxed?

Mr. GRAY said, in his opinion, no. There might be very good economic reasons for the course the Board of Trade had taken; but he again contended that it did not affect the case put before the Referee that gas-mantles should be brought within the schedule. The question of whether the thorium and cerium should be taxed as it formed part of a mantle had never been a part of the case of the complainants. He had not considered it, and was not prepared to deal with it now. It might have to be dealt with later in regard to the Customs.

Sir ARTHUR COLEFAX then addressed the Referee, on the lines already indicated, for the thorium nitrate manufacturers. The word "Compound" in the schedule clearly meant something more than a chemical compound as understood by the chemist, and must refer to a mechanical mixture as well as a purely chemical compound. All the dictionary definitions of the word compound gave the double meaning to it; and how could it be said that an Act of Parliament was addressed only to scientific men or chemists. The whole of the case of the opposition was that a mantle was an aggregate of thorium and cerium, and was not a chemical combination.

Mr. GRAY said it was not contended that it was a mere mechanical aggregate, but that in the finished mantle there were other things.

The REFEREE said he could not see any difference between the collodion and a coat of paint and varnish; and he did not think anything could turn on the collodion.

Sir ARTHUR COLEFAX emphasized the point that thorium was used only for gas-mantles, in spite of the other uses which Mr. Gray had put forward but which those engaged in the industry had not been able to develop simply—they were infinitesimal. Unless, in these circumstances, the mantles were taxable, then the inclusion of thorium and cerium in the schedule was absolutely useless and purposeless. It nullified the whole intention of the Act in so far as any protection was given to the gas-mantle industry in this country. There was no question that the Referee could not consider matters that were discussed in the House of Commons during the consideration of the financial resolutions. He could not consider anything but the words of the Act; and for that contention there were important legal precedents.

The REFEREE said at the moment he thought the mixture of thorium and cerium in a mantle was taxable *qua* mixture. His difficulty was whether it was taxable as a manufactured article. Mr. Gray had put the point that it was not very forcible, and that was the real point he wished to have dealt with by Counsel.

Sir ARTHUR COLEFAX submitted that as a mantle was substantially nothing but a compound of thorium and cerium, then it undoubtedly came within the schedule.

The REFEREE said the mantle was at least a compound article, and then the question arose as to loss of identity.

Sir ARTHUR COLEFAX said there might be some little doubt as to the true meaning of the section of the Act which dealt with loss of identity of a taxable ingredient in a compound article. For instance, scientific glassware did not consist wholly of glass, and yet it was taxable as glassware. In the case of the mantle, it was a compound article looked at from that point of view; and if they removed the little bit of asbestos or the clay ring, they still had the compound of thorium and cerium. As to the argument that mantles were not included because the words "manufactured products" did not appear after the words "compounds of thorium and cerium," as was the case with metallic tungsten, Counsel argued that without these words in the case of metallic tungsten, pure tungsten wire would not be included, and they were unnecessary in the case of thorium and cerium because the only article manufactured from them was the mantle.

Mr. TERRELL, for the Incandescent Gas-Mantle Manufacturers Association, in his closing speech, said that the clear meaning of the word "compound" in the schedule was that the article consisted of more than one thing, irrespective of whether it was a chemical combination or a mere mixture. Once that was established, then gas-mantles came into the schedule almost automatically. There was nothing commercial in the world except compounds of thorium and cerium. Under the head of scientific glassware, the Board of Trade in their list had included a whole crowd of things which were composed of many other things than glass.

Mr. JACQUES ABADY pointed out that these articles were also included under scientific instruments.

Mr. TERRELL, in conclusion, said that without the import of thorium and cerium there would be no gas-mantle making here; and if gas-mantles were to be allowed to come in, there could be no import of thorium and cerium, because it would not pay to manufacture it.

The Referee intimated that he would give his decision on Saturday.

Belper Council and Gas Prices.—The Belper Urban District Council have discussed an announcement by the Derby Gas Company of a reduction in the price of gas at Derby from Jan. 1 next of 9d. per 1000 c.ft., which would make Derby gas the cheapest in the Midlands. It was pointed out that Belper derives its supplies from the Derby Gas Company; and it was urged that the reduction in price very seriously concerns the people of Belper, who should be granted a similar concession. The Council decided to approach the Company requesting that the consumers in the Belper district should be treated in the same way as those at Derby.

GAS REGULATION ACT APPLICATIONS.

The following further notices have appeared in the "London Gazette" of applications by gas undertakings to the Board of Trade under section 1 of the Gas Regulation Act.

Annfield Plain and District Gas Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 4s. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 1s. 8·4d. per therm.

Clevedon Gas Company.

The maximum price now authorized in respect of the supply of gas by the undertakers is 5s. 6d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 1s. 8·6d. per therm.

Garw and Ogmore Gas Company.

The maximum price now authorized in respect of the supply of gas by the undertakers is 7s. 3d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 2s. per therm.

Halesowen Gas Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 4s. 6d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 1s. 8d. per therm.

Kildwick Parish Gas Company.

The maximum price now authorized in respect of the supply of gas by the undertakers is 5s. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 1s. 8d. per therm.

Portishead Gas Company, Ltd.

The standard price now authorized in respect of the supply of gas by the undertakers is 4s. 6d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 14·56d. per therm. The maximum price now authorized in respect of the supply of gas by the undertakers is 5s. 3d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 16·36d. per therm.

St. Helens Borough.

The maximum price now authorized in respect of the supply of gas by the undertakers is 6s. per 1000 c.ft. within the borough of St. Helens, and 6s. 6d. outside; and the prices they have asked the Board of Trade to substitute for these are 14·4d. and 15·6d. per therm.

DECLARATIONS OF CALORIFIC POWER.

Hampton Court Gas Company.—450 B.Th.U. (Dec. 1.)
Westbury Gas and Coke Company.—500 B.Th.U. (Dec. 1.)
York Gas Company.—480 B.Th.U. (Dec. 1.)

GAS REGULATION ACT ORDERS.

There have been forwarded by the Director of Gas Administration copies of the following further Orders made by the Board of Trade under section 1 of the Gas Regulation Act.

Bury St. Edmunds Gas Company.

After the declared date, the standard price in respect of gas supplied by the undertakers shall be 15d. per therm.

For the purpose of ascertaining the authorized rate of dividend for the year in which the declared date occurs, the price charged per 1000 c.ft. during that part of the year (if any) before the declared date shall be rendered into the equivalent price per therm by dividing it by five-and-one-half. (Nov. 28)

South Oxfordshire Water and Gas Company.

After the declared date, the standard price in respect of gas supplied by the undertakers shall be 22·8d. per therm.

For the purpose of ascertaining the authorized rate of dividend for the year in which the declared date occurs, the price charged per 1000 c.ft. during that part of the year (if any) before the declared date shall be rendered into the equivalent price per therm by dividing it by four.

Prepayment meter clauses are included. (Nov. 26.)

Winchester Water and Gas Company.

As from the declared date, the maximum price in respect of gas supplied by the undertakers shall be 18·4d. per therm. (Nov. 29.)

GAS SUPPLY OF STRETFORD.

With regard to the intimation which appeared on p. 634 of last week's "JOURNAL," of the fact that the Stretford and adjoining District Councils have given notice of their intention to present a Bill in Parliament to constitute a Gas Board for the purpose, among other things, of acquiring from the Manchester Corporation the undertaking of the Stretford Gas Company, the following statement has appeared in the "Manchester Guardian:"

It is only a few months ago that Manchester bought this undertaking for £300,000, having promoted a Bill in Parliament for the purpose, and the demand notes for the gas charges for the first quarter were only recently presented. The proposed Gas Board is to consist of representatives of the Stretford, Urmston, Ashton-on-Mersey, and Sale Urban District Councils and the Burton-on-Irwell and Bucklow Rural District Councils, or any two or more of such councils. Provision is made for the repeal of the powers of the Manchester Corporation and the Altrincham Gas Company to supply gas in any part of the district covered by the Board.

Stretford is the leader in this movement. The contention of the authorities there is that the sale of the undertaking of the Gas Company was arranged without their knowledge, and that Manchester had no right to annex the gas undertaking of a private company in the Stretford area—Stretford being the lighting authority. Stretford opposed the Manchester Bill in Parliament.

One of the members of the District Council has stated that they obtained a promise from Manchester that if during a year from the date when the Act came into operation Stretford desired to buy the undertaking of the Gas Company from Manchester, the Corporation would let Stretford have it for the price (£300,000) Manchester had paid and the expenses that had been incurred in promoting the Bill. Another member said it was clearly stated in the Bill that Stretford was the lighting authority, and also if Stretford promoted a Bill to purchase the undertaking from Manchester they would be given the opportunity. Stretford had been trying for many years, he added, to form a Gas Board to include the adjoining areas, but had not been successful until the proceedings connected with the promotion of the Manchester Bill.

TORONTO CONSUMERS' GAS COMPANY.

The seventy-third annual report and accounts (for the year ended Sept. 30) were adopted at the meeting of the Consumers' Gas Company of Toronto, which was held on Oct. 31.

The report notified an increase of 4762 in the number of consumers. After payment of the interest charges and the usual dividend, there remained a surplus profit of $352,989. This has been restored to the reserve fund to compensate partially for withdrawals made during the war years. The reserve fund is now $140,906 short of the statutory limit; and the Company's Act provides that when surplus profits accumulate beyond what is necessary to maintain the reserve fund, such surplus profits shall be allocated to the consumers by way of reduction in the price of gas. Anticipating a decrease in freight tariffs and labour rates, the Directors expect, during the coming year, to make a re-adjustment in the rates charged for gas, which will result in a large saving to the consumers. The Company have been confronted with a continuance of high operating costs. The year began with prices for coal and gas oil at the peak; and though there has been a slight recession in the prices of these commodities, yet the average prices for the year have been higher than in any previous year in the history of the Company. Additions to the manufacturing plant, consisting of two oil-gas sets, have been satisfactorily completed.

The President (Mr. A. W. Austin) said the report was an exceptionally good one. In fact, he considered it one of the best in the history of the Company. It was hoped that in the coming year they would be able to completely restore the reserve fund and reduce the price of gas to the consumers. Their good fortune in being covered by favourable contracts for coal, oil, &c., in the past year had placed them in this enviable position. It was intended during the coming year to commence work on a new unit for the manufacture of gas, which would take two or three years to complete. It would also be necessary to lay some very large mains to certain parts of the city, where the present mains were becoming over-taxed.

It was said by the Vice-President (Mr. Wellington Francis, K.C.) that, good year or bad, both consumers and consumption had always increased, and during the past ten years had more than doubled, despite most adverse circumstances.

Mr. Arthur Hewitt (the General Manager) remarked that, for the first time since the war, things were assuming a normal basis. From 1914 to 1916 it was the duty of the Company to take a fair share of the burden of the war by maintaining the price of gas at a low rate. The first price increase was made in 1917, and was followed by other moderate increases only when every means to keep costs down had been exhausted. He was glad to say, however, that withdrawals made during the war from the reserve fund had been nearly all replaced.

Chichester Gas Company's Finances.—An extraordinary meeting of the City of Chichester Gas Company was held last week, at which a resolution was carried unanimously authorizing the issue of £7000 of 7 p.ct. redeemable debenture stock. It was explained that the money was required to meet an overdraft at the bank, largely due to the new carburetted water gas plant, which has proved a most remunerative expenditure, and in order to provide a necessary sum for working capital.

Gas Charges in Birmingham.—The Birmingham Chamber of Commerce have had under consideration the question of gas charges; and in view of the reductions which have been made in the prices of materials and in wages, they have asked the Birmingham Corporation to reconsider the position, with a view to an early reduction being made. The Chamber point out that quite recently a number of gas undertakings have found it possible to reduce their charges, and that similar action in Birmingham would very substantially assist manufacturers, a number of whom, in order to meet the abnormal conditions, were selling their goods at, or below, cost prices.

Price of Gas in the West Riding.—A letter was read at a meeting of the Thurlstone (West Riding) Urban District Council, from the Penistone Trades and Labour Council, stating that they had sent a resolution to the Penistone Gas Company urging that the price of gas in the district was much too high, and asking for a reduction. The Trades Council now appealed to the Council to support them in their efforts to secure a concession. It was reported that the Gas Company's manager had pointed out that, as a result of the war and strikes, the cost of materials had increased enormously. The price of gas was 114 p.ct. above the pre-war figure, but materials had risen over 200 p.ct.; while the wages at the gas-works had gone up about 250 p.ct. There was a downward tendency now; but the Company had never covered themselves for the advances. For the last eighteen months, interest had not been earned on the loans, let alone dividend on the share capital. The Council decided that they could not support the action of the Trades and Labour Council.

ORIENTAL GAS COMPANY, LTD.

The Ordinary General Meeting of the Company was held last Wednesday, at Finsbury House, Blomfield Street, E.C.—Mr. H. D. ELLIS in the chair.

The SECRETARY (Mr. S. Rainer) read the notice convening the meeting; and the Directors' report and the statement of accounts for the year ended June 30 were taken as read, and the Auditors' certificate was read.

The CHAIRMAN, on rising to move the adoption of the report and accounts, said that he might really sum-up his observations in one remark—if it had given the shareholders half as much pleasure to peruse these accounts as it had given the Board to compile them, then the shareholders had had a very agreeable period. The report told them that the gas-rental continued to show annually a progressive increase; and it dwelt upon the fact that the significance of this would be better appreciated when it was remembered that it was practically only eleven months' working which had produced this result.

FIGURES FROM THE ACCOUNTS.

Turning to the revenue account, and taking first the receipts side, it would be seen that the gas-rental for the year ended June 30 amounted to £76,567, which, as stated in the report, represented an increase of £2968. This had been achieved by the sale of over 15 million c.ft. of gas more than was sold in the previous year; and another pleasing feature was that the increase had been—he thought he might say entirely—derived from the private consumers. With regard to the gas itself, so far as quality was concerned, not one single instance of deficiency in illuminating power or calorific value or purity had occurred in the course of the year. In the matter of pressure, the Company were under heavy penalties to the Corporation for any fall below a prescribed figure. The Corporation maintained 33 recording pressure-gauges in various parts of the city, which were watched by an army of inspectors; but here, again, the Company had not incurred a single penalty for defective pressure. This reflected very great credit upon their General Manager and his staff. He might mention that during the year over a thousand new public lamps had been connected with the mains. The next item on the receipts side of the revenue account was the residuals, and these had yielded £10,591 more than in the preceding year. This was attributable to coke, from which the whole of the gain proceeded. The Company's coke enjoyed a very high reputation; and the market had ruled very firm indeed throughout the year. Tar, on the other hand, had been rather lower in price than in 1920. They could not command the market, and had to sell to the best possible advantage. This they had done; but the receipts had not been quite so good. The same remark applied to sulphate of ammonia. This was the effect, he believed, of reduced demands from tea planters for fertilizers. Then came exchange, which was less by £22,000; but the previous year was phenomenal altogether, as everybody connected with Indian business would recollect. The average rate of exchange for 1920 was 2s. 2·3d., and in the year under review 1s. 6·2d. This was a phenomenon wholly beyond the control of the Board. Coming now to the expenditure, it would be seen that coals, purification, and wages had cost more by £3945. This was a normal and natural increase, inasmuch as they had carbonized 3407 tons more coal than in the previous year. Purification, like most other things, had cost a little more, and the same with wages; but the increase was mainly owing to the bigger business done. Salaries exhibited a small rise; but this, again, was normal. Progressive salaries were enjoyed by valuable officers, who were well worth the increases. Indian income-tax, also, was slightly higher—£1700 more—but this was another matter over which the Directors had no control. Under mains, services, meters, and fittings, there was a considerable increase in expenditure. In regard to the mains and services, this increase was incurred for the Corporation, who, as the shareholders knew, had in hand a grand scheme of improvement in connection with the city thoroughfares. Last April they experienced a good test of the quality of their main-laying; for Calcutta was then visited by a great storm, which laid a great part of it under water. Not one instance of a main being flooded was reported; and this, he thought, was very much to the credit of Mr. Bacon, who was their Mains Superintendent. As to meters, a great many more had been fixed; and here, again, he had a gratifying statement to make. There had not been received one single complaint of inaccuracy of their meters throughout the whole year. In this connection, he must mention Mr. Morrison, who was their Meter Superintendent. With reference to fittings, this had been a progressive year in respect to the increasing demand for gas appliances for power, cooking, and industrial heating purposes generally. It would no doubt surprise the shareholders to learn how many trades, crafts, and vocations there were in Calcutta the proprietors of which had discovered that gas was the most efficient and most economical agent for actuating the various appliances they employed in their business. It would take him too long to give a complete list; and so he must content himself with naming the extremes—the alpha and omega of the catalogue, which extended from furnaces of high power to the humble iron of the working tinman. Between these two, the Company did a very large business in fittings. Under wear and tear of works, there was a considerable reduction. This was owing to the fact that in the previous year there were some very special debits carried to wear and tear, making it look abnormally large. At the same time, there had been no cheese-paring this year, and the General Manager reported that the whole of the Company's buildings, plant, and machinery had been maintained in good condition. Bad debts and allowances showed a reduction of no less than £852. General expenses remained practically the same. In the result, they carried to profit and loss a sum of £31,334. In the profit and loss account, dividends and interest received showed an increase of £1161. This was partly derived from the dividends from the reserve investments, and partly from bank interest on their remittances, which as soon as they were received were placed on deposit at interest until they were wanted. Now he came to the capital account; and there was very little to say about this. The shareholders knew the work the Company had been engaged upon; and the report told them that during the year the Directors had been able to make fairly good progress with the projected operations on the works which were being held-up by the war and its paralyzing consequences. Chief among these operations were the new retort-house and the new gasholder. Well, on account of the new retort-house and the new gasholder, the Directors had carried to the debit of capital £44,176. The retort-house was practically completed; but there was much remaining to be done to the gasholder, though he hoped they would be able to finish this also in the course of the next six or nine months. Amounts due to the Company, as shown in the balance-sheet, remained the same. Coals, products, and sundry stores were considerably more, because there were considerably more of them. They always liked to have a good reserve of stores, as it might not be possible to make good deficiencies just at the time they were wanted. On the other side of the balance-sheet, capital stock, reserve fund, depreciation account, renewals suspense account, and exchange equalization account showed no change. The amount due by the Company was very slightly smaller—£200 less. The balance from profit and loss account (subject to any assessment for excess profits duty and corporation profits tax) was, however, up £8062. This completed his review of the accounts.

STRIKE TROUBLE.

They would remember that when he had the pleasure of addressing them last November, he gave them a full account of the strike which involved Calcutta in the previous month, and had ended in failure. Since then, the Company had had no recrudescence of this trouble within their works until about a fortnight ago, when, intimidated by an armed mob of hired ruffians, some of their men were hindered from entering the works, and gas making was arrested for the day. It was, however, resumed on the morrow; and on the following day full pressure was available, and all the public lamps were lighted. Their men were well paid and well treated. They knew it; and they had no grievance to air. It was only the fear of violence that disturbed their happy relations with their employers. He might add that the Municipal Corporation expressed their satisfaction with the measures taken by Mr. Snelgrove to cope with this emergency. The Board had not yet received a letter with the full details. What he had said came by cable; but he had no doubt matters remained quite satisfactory, or they would have heard further.

AS TO THE FUTURE.

There were also one or two words he would like to say with regard to the future. The development of the natural wealth of India, and its promising fields of enterprise, to which he had sometimes referred at previous meetings, had scarcely kept pace with the hopeful anticipations of a year ago. It was true that a great boom in company promotion was in action during the run of their financial year; but of these undertakings several partook too largely of a speculative character, while others were not able from their inception to command the experienced management indispensable to success. On the other hand, it was gratifying to note the expansion in the iron and steel industry. India contained large quantities of high-grade iron ores of very fine quality, which had long lain unknown or undeveloped. Some of these were now being most successfully worked by the great Tata Company, the Bengal Iron Company, and others. The reproach not long ago levelled at India, that it could not make even a nail or a screw for itself, should soon sound an incredible fable. They did not know what might be awaiting them behind the purdah of the future; but he thought they might fairly forecast that India would not long hence be producing many commodities which it had hitherto had to import. Such a potentiality should be largely beneficial to their Company, even if regard were had only to avoidance of delay, saving of freight, and immunity from damage in transit.

A SAD NOTE.

This concluded his remarks with regard to affairs generally; and he had now reached the only sad item in the report—the death of their esteemed colleague Mr. Archibald Tennent Eastman, a familiar figure to every gentleman who attended these meetings regularly. He was a sound business man of ripe experience, and always helpful on the Directors' side of the table. The shareholders, he was sure, would unite with the Board in expressing their regret at the great loss they had sustained. In conformity with the provisions of the Company's Articles of Association, they had appointed Mr. Basil Murton Gill, one of the Auditors, to the seat at the Board thus rendered vacant and had appointed Mr. Frederick John Bradfield to the vacated auditorship. Mr. Gill bore a name which was well known in that room. His father was a distinguished Chairman of the Company for many years; and he could only say that Mr. Basil Gill was a worthy son of a worthy father. The Directors were very happy to have him with them on the Board. Mr. Bradfield was well known in the profession as one of the most able gas accountants. He was Secretary and Accountant to the Commercial Gas Company; and in the late consultations between the gas companies and the Government in regard to the change-over to calorific value instead of cubic feet, and the various calculations involved, he had taken a prominent part. He concluded by moving that the report of the Directors and statemen of accounts now submitted be received and adopted.

Mr. STANLEY H. JONES formally seconded the resolution.

Mr. J. H. MACKAY said the balance-sheet contained the remark: "Balance from profit and loss account (subject to any assessment for excess profits duty and corporation profits tax)." Therefore they appeared to be paying Indian income-tax, excess profits duty, corporation profits tax, and English income-tax. This being so, he thought they were hit pretty hard; and he would like as much consolation on this point as the Chairman might be prepared to offer.

The CHAIRMAN replied that the Company obtained a rebate in respect to the Indian income-tax. They did not pay the Indian tax and 6s. in the pound on this side too. They deducted 6s. less the amount of the Indian income-tax, which was 2s. 4½d. in the pound.

Mr. MACKAY: Surely we have not to pay excess profits duty, *plus* corporation tax?

The CHAIRMAN: This is the last balance-sheet which will be assessed for excess profits duty.

Mr. PARKER: When your big programme is completed, do you propose in the first instance to add that to your expenditure on capital

account, and then use your renewals suspense account to bring your capital account down again?

The CHAIRMAN: We should leave it as capital expenditure.

Mr. PARKER: You have no less than five different reserves.

The CHAIRMAN: The £30,000 in the renewals suspense account is for repairs to existing plant.

The resolution was then put to the meeting and unanimously carried.

THE DIVIDEND.

On the proposition of the CHAIRMAN, seconded by Mr. B. M. GILL, it was resolved—"That a dividend of 8 p.ct., less income-tax, be declared for the twelve months ended June 30, 1921, and that the same be paid to the proprietors on Dec. 1, less 3½ p.ct. paid on account on May 31 last."

RE-ELECTIONS.

The CHAIRMAN proposed the re-election as Directors of Mr. Bertram W. Ellis and Mr. Basil M. Gill. He said that Mr. Ellis possessed very valuable information, obtained by his having been for some time assistant to the General Manager. He knew Calcutta, the Company's business, and the works and workmen, and, in fact, had just that local knowledge which was indispensable to them on the Board. He (the Chairman) had already expressed his opinion of Mr. Gill.

Mr. H. H. MACLEOD seconded the proposition, which was agreed to.

The Auditors (Messrs. S. W. Savage and F. J. Bradfield) were re-appointed, on the motion of Mr. H. S. WHILE, seconded by Mr. J. C. WATSON.

VOTES OF THANKS.

The CHAIRMAN said it was now his pleasure to propose a vote of thanks to the Manager, the Secretary, and the staff generally for their services during the past year. He remarked that he would only be repeating himself if he sounded the praises of Mr. Snelgrove. These accounts were the most eloquent testimony to the fitness and ability of the General Manager, and they owed a great deal to him. Mention must also be made of members of the staff. The first was Mr. Pearson, the Assistant Engineer, who had had charge of the works from time to time when Mr. Snelgrove had been temporarily away, either on business or when, unfortunately, he had been laid aside by indisposition, and then Mr. Pearson had shown himself a most efficient assistant. Mr. Bacon, the Mains Superintendent, he had already mentioned. Mr. Smith, the Works Superintendent, was a very good worker. They had no complaints whatever with regard to the condition of the works. Mr. Savage was their Chemist and General Works Superintendent. He was a talented chemist, and gave the utmost satisfaction in connection with his department. Mr. Morrison, the Meter Superintendent, he had already alluded to. Mr. Garsed, the Accountant, had also modelled the system of accounts in a way which had made them much more informative, and had also improved the book-keeping. And Mr. Hayward, the last on the list, was their meter repairer, who also did his work very well. To all these gentlemen they owed thanks for their services. At home, you see we still have our excellent Secretary, Mr. Rainer, who discharges his duties to our entire satisfaction. To him, and to his staff, our thanks are due.

Mr. B. W. ELLIS said he was very glad to be called upon to second this vote of thanks to the staff in Calcutta and in London, though the Chairman had left him very little to say. But having lived in Calcutta, he (the speaker) was enabled to picture to himself very completely the life of the staff out there; and it was not at all a "bed of roses," as they would all understand from what the Chairman had said about political agitators interfering with the men and their work. It fell very hard indeed upon the staff to have, not only the day-to-day work which they had to do, but this constant interference from outside. The Directors and shareholders should assure them of their sympathy in this trouble to which they were put from time to time. The proprietors were to be congratulated upon the fact that they had such men working for them. The Directors knew them all personally; and they were most excellent men. With regard to the home staff, Mr. Rainer, Mr. Hentsch, and other assistants had carried out their duties splendidly; and thanks were due also to them.

The vote was cordially passed, and briefly acknowledged by Mr. RAINER.

Mr. MACKAY proposed a vote of thanks to the Chairman and Directors for the way in which they had conducted the affairs of the Company for the past year. At the meeting twelve months ago, he said, he made rather a pathetic appeal to the Chairman with regard to the profit that had been realized on exchange; and that gentleman was as unsympathetic as he could be to the suggestion that the Board should give the shareholders some of this particular profit. But on thinking the matter over, he had come to the conclusion that the Chairman was right and he himself was wrong, because the Directors had utilized the money most helpfully to the proprietors. They had used it to improve the condition of the plant. Therefore, he withdrew what he said on the subject last year, and congratulated the Chairman most sincerely upon having stuck to his guns, and not parted with the money. Of course, a company like theirs were to be commiserated with on the trouble that arose with labour in Calcutta. He had heard of another gas company who were also very much troubled by agitators. There was a very fussy native barrister, who got at the men and induced them to strike. They did not really want to strike. Wages had just been rearranged to their entire satisfaction; but this distinguished "limb of the law" persuaded them to strike. However, after having upset the works for four days, the men took the matter into their own hands, and went back to their jobs, and harmony prevailed once more. Possibly the same sort of thing would be found at Calcutta. The agitators would not be pleased to see the men working amicably; and so something of the kind might be expected. But he was sure the Manager would be perfectly competent to deal with the matter when it came along.

Mr. C. SANGSTER seconded the vote, which was heartily accorded.

The CHAIRMAN, returning thanks on behalf of his colleagues and himself, said it had been a great pleasure to them to conduct the busi-

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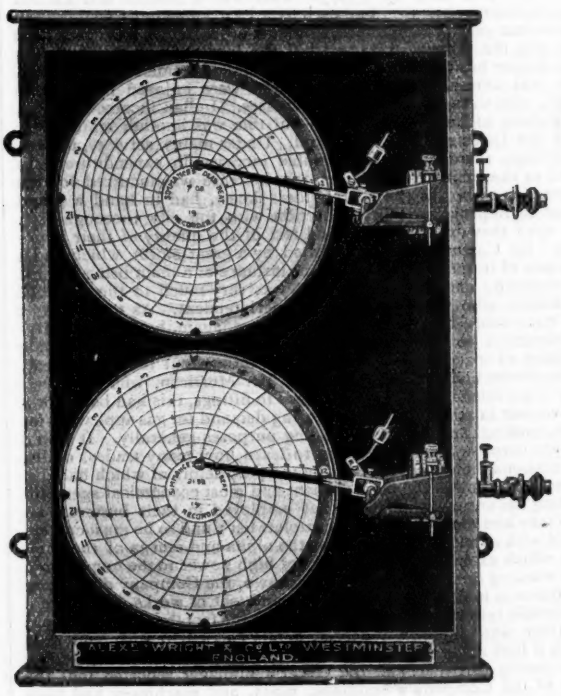

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ness of the Company during a year in which such excellent results had been attained. It had, of course, not been without much anxiety. There had been the difficulty of getting the necessary material out there, and various other impediments; but they had been able to lay before the shareholders accounts which had pleased them, and this was sufficient for the Board.

COLONIAL GAS ASSOCIATION, LTD.

An Extremely Satisfactory Report.

The Thirty-Third Ordinary General Meeting of the Association was held on Tuesday of last week, at the Cannon Street Hotel, London, E.C.—Mr. SAMUEL SPENCER in the chair.

The SECRETARY (Mr. A. J. Kingdon) read the notice convening the meeting and the report of the Auditors; and the Directors' report and the statement of accounts were taken as read.

The CHAIRMAN said it was with much pleasure that the Directors met the shareholders again on this occasion of the thirty-third annual gathering, with the most satisfactory report of the past year's working. Those in the room would have noticed that one of the Directors, the Hon. Sir John W. Taverner, K.C.M.G., was not present. He had some private business to transact in Melbourne, and had arranged during his stay there to take part in the Board meeting in the Melbourne office of the Association. No doubt, on his return to this country he would be able to give them the benefit of his views of their property and prospects in Australia. Such a report as they were now able to present would, the Directors felt confident, prove gratifying to the shareholders. When meeting the shareholders last year, the Directors were not very sanguine of continuing the largely increasing sales of the past few years. At the start of the present year there was a coal strike on, and later a seamen's strike, which interfered very much with their progress for some two or three months; but the result had come about with a small percentage of increased sales, which, to the thinking of the Board, must be considered fairly satisfactory. With a sale of gas amounting to upwards of 288 million c.ft., and a sale of 11,172 c.ft. of gas per ton of coal carbonized—in addition to the residuals, coke, tar, &c.—the increases were really very gratifying. The balance-sheet showed an increase of sales giving £24,000 as an extra over the previous year. These figures must be pleasing to the shareholders. It was interesting to note that the revenue for 1916 was £68,875, while for the twelve months ended June last it amounted to £135,541—having thus doubled in the five years. At June last the consumers numbered 14,163, including an increase for the year of 790 consumers, and over 1000 cookers, heaters, &c. Every shareholder who had carefully studied them must, he felt sure, be satisfied with what was stated in the report and with the excellent figures shown on the balance-sheet; and they would all no doubt agree with the statement that he made in the opening remarks of his address last year. Shareholders would note with pleasure that the Association were able to pay an increased dividend of 8 p.ct. (less tax) on the ordinary shares, and with a slightly larger carry-forward balance than last year of £6445, after paying the debenture interest and preference dividends. It would be gathered from the report that the Directors had issued £25,000 more debentures, and that they were offering to the shareholders a further £21,000 of 8½ p.ct. debentures, which they had every confidence in recommending them to take up. This was a somewhat odd amount; but it was closing their present capital account, and later the Board would have to ask the shareholders for power to increase the loan borrowing powers. As to the current year, the Directors felt satisfied that the prospects were good; and with cheaper coal and materials, they had every hope of maintaining the dividend now recommended, if not of increasing it. With these few remarks, he had pleasure in moving that the report and balance-sheet now presented be adopted.

Mr. CHARLES HUNT seconded the resolution.

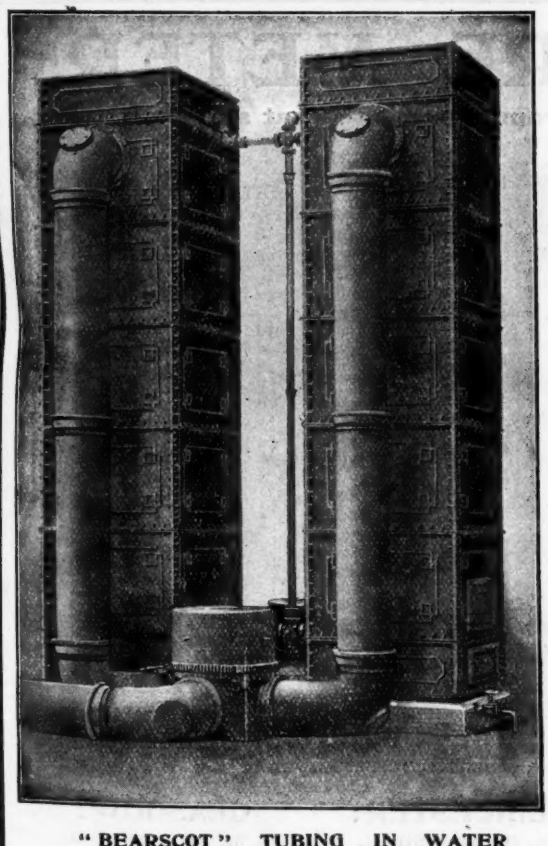
Mr. A. CADDICK (Croydon) said he would like to add a word of congratulation to the Directors upon the excellent balance-sheet just presented—especially considering the labour troubles that had been lately experienced. He would suggest that the balance-sheet should show the increase or decrease in the sale of gas during the period under review as compared with the previous year. He noticed with pleasure the statement in the circular announcing the issue of debenture stock that the average increase in the consumption of gas over the past five years had been at the rate of 5½ p.ct. per annum. If the yearly increase could in future be included in the accounts, it would be of interest to the shareholders.

The resolution was then carried unanimously.

The CHAIRMAN said he thought they might safely reckon upon a continuance of the dividend now suggested. Australia was a marvellous country; and it would no doubt recover its prosperity sooner than other parts of the world. He proposed—"That a dividend at the rate of 8 p.ct. per annum, less income-tax at 3s. 8d. in the pound, for the year ended June 30 last, be declared on the ordinary shares; that such dividend be made payable on and after Dec. 1; and that £1000 be added to the reserve fund account." He pointed out that for the past eight years they had gone on increasing the dividend by ½ p.ct. per annum; and he did not think this would have been done had any falling-off been thought likely.

Mr. H. KING-HILLER seconded the proposition, which was agreed to.

The CHAIRMAN said the Association started over thirty years ago with a very small issue of capital, and paid a dividend in the first six months of their existence. This they had gone on doing since. Unfortunately, they had a set-back during the land troubles a quarter-of-a-century ago; but from that time they had gone up from 2½ p.ct. to the present rate, which was the highest on record. He therefore thought they need not hesitate to give the Board further borrowing powers. The undertaking had a fine future; and money beyond the present issue of



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£21,000 could be usefully employed. He proposed—"That the borrowing powers of the Directors be increased, and that they be, and are hereby, authorized to raise and borrow money in the name, and for the purposes, of the Company, to an extent not exceeding two-thirds of the capital of the Company for the time being issued."

Mr. HUNT, in support, said it was essential that more money should be raised in the immediate future.

Mr. A. A. SAWARD asked whether there was any urgent necessity for this additional money, or was it merely intended as a reserve upon which the Directors could draw? Were the gas-works in an efficient condition, or was the money required for repairs and renewals?

The CHAIRMAN replied that they were wanting capital all the time. Now they had come to their last £21,000, which had been over-spent a long while. He believed they spent £10,000 in the past year on retorts, &c. Everything was in good order; but for several years a gasholder had been needed. He firmly believed they would have had 500 more consumers at the present time, had sufficient storage accommodation been available. The holder alone would cost £20,000 or £30,000; and if it were put in hand immediately, it would be in the best interests of the Association. After the present £21,000 had been issued, the Directors would probably ask for £30,000 or £40,000 more. Of course, the works were kept up to "concert pitch" out of revenue.

Mr. SAWARD seconded the proposition, which was carried.

The CHAIRMAN proposed the re-election as Directors of the Hon. Sir John W. Taverner and Mr. P. C. Holmes Hunt, remarking upon the great value to the Association of the services which both gentlemen rendered.

Mr. F. R. SMITH, who seconded, said that, in addition to the information they would receive from Sir John Taverner on his return to this country, they expected at no distant date to have Mr. Holmes Hunt over here to consult on matters connected with the business. There were many things requiring attention, all about which Mr. Phillip Holmes Hunt, as Chairman of the local Board, would be able to tell them. He had had a large experience in gas matters, not only in this country, but in Australia.

The resolution was passed; and thereafter the Auditors (Messrs. Wood, Drew, and Co.) were appointed, on the motion of Mr. SAWARD, seconded by Mr. H. S. WHILE.

The CHAIRMAN proposed a hearty vote of thanks to the Chairman of the Local Board in Melbourne and his colleagues, and also to the staff and employees at the works and offices. They had all, he said, had a strenuous time, and deserved every credit for the record results achieved.

Mr. CADDICK seconded the vote, which was heartily accorded.

The Chairman and Directors were also thanked, on the proposition of Mr. CADDICK, seconded by Mr. SAWARD.

The CHAIRMAN, in acknowledgment, said he had occupied his position for 26 years, and perhaps it was time someone else took his place; but as long as he retained his health, he would be pleased to continue his duties.

TRADE NOTES.

[For "Journal" Advertisers.]

New Feature of the Turbine Patent Furnace.

The new design of the bridge-plate in the "Turbine" furnace offers an interesting constructional feature. The cleaning-door has been somewhat brought forward; and the rear-end of the bridge-plate is positively supported by a ribbed bracket, which is shaped to allow for the removal of dust, and at the same time to provide a free passage for sufficient air to complete the combustion of any carbon monoxide which may accumulate between the bridge-plate and the firebrick arch, which is spaced about 18 in. from the rear of the bridge. The address of the Company is No. 2388, Gray's Inn Road, W.C.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Dec.* 5.

The London tar products market is almost without change. The improved firmness in pitch is a notable feature; the price for export being about 57s. 6d. to 60s. net per ton f.o.b. makers' works. While business in creosote is reported at 7½d. net per gallon in bulk *ex* makers' works, it might perhaps be possible to buy a tanker's cargo at a shade less. Other products are unaltered.

Tar Products in the Provinces.

Dec. 5.

The average values for gas-works products during last week were: Gas-works coal tar, 42s. 6d. to 46s. 6d. Pitch, East Coast, 45s. to 47s. 6d; West Coast—Manchester, 40s. to 45s.; Liverpool, 40s. to 45s.; Clyde, 40s. to 45s. Benzole 90 p.ct. North, 2s. 4d. to 2s. 6d.; crude 65 p.ct. at 120° C., 1s. 11d. to 2s. naked at makers' works; 50-90 p.ct., naked, North, 2s. 3d. to 2s. 4d. Toluole, naked, North, 3s. to 3s. 1½d. nominal. Coal tar crude naphtha in bulk, North, 11d. to 11½d. Solvent naphtha, naked, North, 2s. 8d. to 2s. 9d. Heavy naphtha, North, 2s. 7d. to 2s. 9d. Creosote, in bulk, North, liquid, 6d. to 6½d.; salty, 5¾d. to 6¼d. Heavy oils, in bulk, North, 9d. to 9½d. Carbolic acid, 60 p.ct., 1s. 6d. Naphthalene, £15 to £20; salts, £7 to £9, bags included. Anthracene, "A" quality, 8d. to 10d. per minimum 40 p.ct.; "B" quality, nominal.

FROM A MARKET CORRESPONDENT.

Bye-Products Trade.

There is rather more activity in the market for coal-tar products, and a fair amount of business has been done in various lines. Prices,

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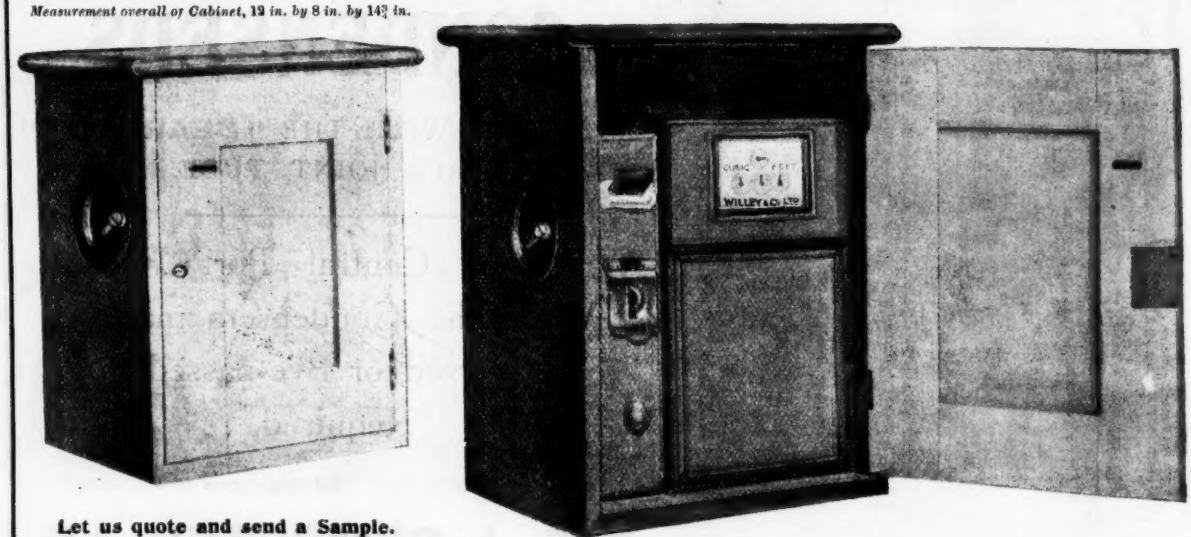

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however, continue to fall away, with the exception of pitch. In this case, merchants who have made large forward contracts at low prices appear to be getting somewhat nervous about their position, with the result that there have been many buying inquiries, which has brought about a recovery in quotations to about 45s. to 50s. per ton. The demand for solvent naphtha is quiet at about 2s. 10d. per gallon; while crude naphtha is quoted round about 1s. per gallon. Naphthalene remains a weak market with little inquiry. Refined is still dull at £16 per ton; but lower grades of crude naphthas are offered at about £4 10s. to £5 per ton. Benzole is firm on the scarcity of this material, and would be much dearer if it were not for the competition of petrol. At the same time it should be pointed out that supplies tend to become rather more plentiful. Benzole 90 p.ct. is obtainable at 2s. 8d. per gallon, and pure benzole up to 4s. Creosote is still weak, with a downward tendency, and one hears of 6½d. per gallon being accepted, although probably 6¾d. to 7d. per gallon is nearer the mark. There is nothing doing in carbolic acid. Cresylic acid is worth only 2s. 3d. per gallon for pale 97/99 p.ct., and 2s. for dark 95/97 p.ct. In intermediate products business has been quiet since my last report, and consumers are only covering their immediate necessities. Aniline oil and salt are very firm, however, and fair-sized orders have been placed at 1s. 7d. and 1s. 8d. per lb. respectively. Beta-naphthol continues quiet at last quoted rates. Resorcin has been inquired for at 6s. per lb. for technical grade, and salicylic acid at 1s. 4d. per lb. for technical grade.

Sulphate of Ammonia.

There has been some improvement in business during the last two weeks, due to a better inquiry on export account, rather than an increased consumption at home. Such inquiry as there has been for home trade has been more or less limited to forward business early next year. On the whole, however, the general tone of the market has been better. Prices are fixed up to the end of December; neutral quality being £15 13s. per ton, and ordinary quality £14 10s. per ton. Export trade is being executed on the basis of £16 10s., and shipments have been made for a fairly large tonnage to Spain, Portugal, Belgium, France, and the Far East. It is reported that the French Sulphate of Ammonia Bureau has fixed the price of sulphate for December at 95 frs. per 100 kilos f.o.r. at works for ordinary quality and 100 frs. for extra dry quality. German sulphate of ammonia is quoted at 92 frs. per 100 kilos on rail at the French frontier. At the present time there does not appear to be any sulphate of ammonia available in France, and the probability is that that country will need to fall back on the British market for her supplies. In America the position is rather flat at the moment. From being a large importer of this material before the war, the United States has now become one of the largest producers and exporters, and the fact remains that sulphate of ammonia can be purchased much more cheaply there than anywhere else.

Continental Union Gas Company, Ltd.

The accounts for the financial year ended June 30 will be submitted at the meeting of the Company next Tuesday. In their report to the shareholders, the Directors state that the unsettled conditions from which the industries of every country were suffering when they issued their last report unfortunately became intensified during the year under review. Gas undertakings were affected in a special measure, as the coal mining industry, on which they are dependent, became the storm-centre of the industrial disturbance. It would seem, however, that latterly, in this and other trades, the relations between capital and labour are becoming less strained as the economic necessities of the situation are recognized; and the general outlook is rather more hopeful. The coal strikes had a very prejudicial effect on the export trade of this country, and enabled American coal to supplant our products, both in European and South American markets. It is hoped that reductions in the cost of coal-getting and freights will make possible the gradual recovery of these lost markets, to the advantage alike of home employment and Continental buyers, including the gas undertakings in allied countries in which this Company is largely interested. The high prices of coal which ruled during the greater part of the financial year increased largely the cost of gas-making, and thus brought about a considerable decrease in the quantity of gas sold. Since the early part of the year, unfortunately, a severe decline in the selling price of coke and other bye-products, owing to industrial depression, has added to the troubles of the gas companies—more especially those operating on the Continent. The Directors are pleased to report that the Compagnie L'Union des Gaz has paid the final dividend, which had been declared, but had remained in abeyance, owing to war conditions, since January, 1915. This explains the large increase in the receipts from dividends and interest credited to the profit and loss account. After deducting management expenses and pensions charges, and making provision for income-tax and corporations profits tax, there remained a credit balance of £15,156, being an increase of £13,955 over last year. The Directors have transferred £9000 of this amount to a contingency fund, which has been applied in writing-down the Company's general investments and its English gas holdings to the values at which they were quoted on June 30 last. No reliable valuation can be made of the large Continental holdings at present. Their ultimate value must depend on an improvement in economic conditions, which time alone can effect. Out of the balance of £6156 remaining at the credit of the profit and loss account, the Directors recommend the payment of a dividend of 3 p.ct., less income-tax, on the preference stock. This will absorb £4200, leaving a balance of £1956 to be carried forward.

A deputation from the Gas Company of Tokio, Japan, is to visit Dunfermline in a short time, to inspect the recently installed Woodall-Duckham vertical retorts. The object of the visit is to ascertain whether a similar installation would be suitable for Tokio.

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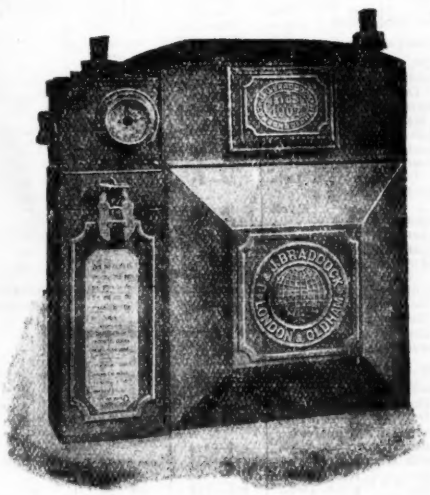

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AND 45 & 47, WESTMINSTER BRIDGE ROAD, LONDON, S.E. 1.

Telegrams—"METRIQUE, LAMB LONDON." Telephone No. 2412 HOP.

Fatality at the Wandsworth Gas-Works.—A distressing accident which occurred in a furnace-pit at the Wandsworth Gas-Works, as a result of which a stoker named George Hall, aged 57 years, received scalds that proved fatal, was inquired into by Mr. Ingleby Oddie. It was stated during the evidence that deceased was in the furnace-pit when some clinker fell into water lying in the ash-pan. A cloud of steam arose, and he was scalded. Some false bars were provided for clinkering; but deceased had omitted to use them, with the result that the accident happened. Mr. Cyril M. Croft (Chief Engineer of the Company) stated that the furnace had always been in charge of a man trained for the work. The correct method for carrying-out clinkering was for the false bars to be put in first; the function of these bars being to hold up the fire. The fire-bars were then removed. This was a general practice. Every furnace had these bars. There were more than forty furnaces in use; and they had never before had an accident. A verdict of "Accidental death" was recorded.

Popular Educational Lectures at Lower Sydenham.—On the suggestion of the Works Committee, the Directors of the South Suburban Gas Company have arranged a highly attractive series of popular educational lectures to be given during the winter in the Livesey Memorial Hall, Lower Sydenham. Where possible, the lectures will be illustrated by experiments and lantern slides. The first lecture of the series was given yesterday, Dec. 6, and was on "Our Co-Partnership," by Mr. J. H. Boraston, C.B., O.B.E. (a Director of the Company). Subsequent lectures will be: Jan. 10, 1922, "Origin and Development of the Gas Industry," by Mr. Thomas Glover, C.B.E., M.Inst.C.E., of Norwich. Feb. 14, "Carbonizing—Past and Present," by Mr. James Paterson, M.A., of Cheltenham. March 7, "Flame," by Mr. Frank Prentice, of Ipswich. April 4, "Modern Gas Making," by Mr. John Terrace, Chief Engineer of the South Suburban Gas Company. The chair will be taken each evening at 8 o'clock by Mr. Charles Hunt, M.Inst.C.E., supported by the other Directors.

STOCK MARKET REPORT.

THINGS on the Stock Exchange last week took a better turn; but they were rather slow in beginning, and the first day or two were dullish. However, they progressed from the start, and at the finish some markets were fairly cheerful. In the gilt-edged department, Home Government issues were rather uneven, War Loan and Funding scoring *plus*, and Consols and Victory *minus*.

Business in the Gas Market was less in volume, Imperial Continental having quieted down and Gas Lights having a monopoly of activity. The London Companies were steady, and Gas Light maximum and preference advanced. Numerous quotations in Suburban and Provincial Companies were put up—viz., Brentford "A" and "B" 2 each, Brighton and Hoves 2 and 1, Croydon "A" 10 and ditto "B" and "C" 5, South Suburban 2, Southampton 1, and Tottenham "A" and "B" 3 each. Melbourne bonds rose 4½, and Primitiva debenture was 1 higher. Imperial Continental fell 3.

Bargains done for cash during the week were as follows: On Monday, Bombay 3 7/16, British 22½, 23⅛, 23½, Cape Town preference 4 7/16, 5, European 6½, 6⅝, Gas Light ordinary 64, 64½, 64¾, ditto maximum 46½, 46⅝, 47, ditto preference 61½, 61⅝, 62, Imperial Continental 138, 138½, 139, 139½, Primitiva 13s. 6d., South Metropolitan 70, 70½, Bournemouth 7 p.ct. debenture 101, 101½, 102. On Tuesday, Alliance and Dublin 49⅜, 49⅝, ditto debenture 47, 48, 49, Bombay 3 3/16, Brighton and Hove original 118⅜, British 22½, 23⅛, 23½, Gas Light ordinary 63 31/32, 64½, 64¾, 64⅞, ditto maximum 47, ditto debenture 51½, Hornsey 102, 102½, Imperial Continental 137, ditto debenture 83½, 84, Malta and Mediterranean 2⅛, Primitiva 12s. 6d., ditto preference 39s., 39s. 9d., South Metropolitan 69½, ditto 6½ p.ct. debenture 100, 100½, Tottenham "A" 67, 67½, ditto "B" 57, 57½, 57½, Brighton and Hove 6 p.ct. "B" preference 88½, 89. Malta and Mediterranean 2nd preference 2½, Southgate 10 p.ct. 100, 100½, ditto 7 p.ct. maximum 75, 75½, ditto 5 p.ct. preference 70. On Wednesday, Alliance and Dublin 48, Brentford "A" 72, 72½, ditto "B" 73, 74, Brighton and Hove ordinary 122, British 23½, 23⅝, Continental Union 19, ditto preference 38, 39, Gas Light ordinary 63⅞, 63¾, 64½, 64⅝, 64 7/16, 64¾, ditto maximum 47½, 48, ditto preference 62, ditto debenture 51⅜, 52½, Hornsey 102½, Imperial Continental 136½, 137, 137½, 138½, South Metropolitan 70, 70½, Tottenham 6 p.ct. mortgage 91½, 92, Hornsey 5 p.ct. preference 66, 66½, Hampton Court 5 p.ct. 55, 55½, 57. On Thursday, Alliance and Dublin 49⅛, Gas Light ordinary 64, 64½, 64¾, 64⅞, ditto maximum 47, 49, ditto preference 61½, 62, ditto debenture 51⅜, 52½, Imperial Continental 135, 136, South Metropolitan 69½, 69⅝, 70, 70½, 70¾, South Suburban 70, 70¾, 70½, 70⅝, Southampton debenture 59, 60, Tottenham "B" 57, Bournemouth 7 p.ct. debenture 102, Woking 8 p.ct. preference 100. On Friday, Brighton and Hove ordinary 89, 90, Cape Town 6½, Continental Union 20½, European 6⅜, 6⅝, Gas Light ordinary 64½, 64⅝, 64¾, 64⅞, 64 15/16, ditto maximum 47½, 47¾, 48, ditto preference 61½, 62, ditto debenture 51⅜, 52½, Imperial Continental 134½, 135, South Suburban 71, 71½, ditto 7 p.ct. debenture 102⅜, Folkestone 42½.

In the Money Market, there was some briskness during the earlier portion of the week, after which—ample supplies coming to the rescue—the position eased-away comfortably. Discount rates took much the same course. Silver was rather dull, and the price dropped to 37½d. The Bank rate is 5 p.ct., as fixed on Nov. 3.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue.	Share.	When ex-Dividend.	Ante-War Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
£			p.c.					
182,049	Stk.	Aug. 26	4	4%	Aldershot 4 p.c. Pref.	...	50—55	
1,551,868	"	Oct. 13	2½	3 1/16%	Alliance & Dublin Ord.	59—64	48—51	48—49⅛
374,000	"	July 14	4	4%	Do. 4 p.c. Deb.	76—79	46—51	47—49
280,000	5	Nov. 30	7½	4/-	Bombay, Ltd.	5½—6½	2 31/32	3 1/16—3 1/16
100,000	5	Aug. 11	16	4/7½	Bournemouth Gas and Water { 5 p.c.	...	78—82	
383,110	10	"	7	7/-	" B 7 p.c.	15—15½	81—82	
115,000	10	"	6	6/-	" Pref. 6 p.c.	13½—14	78—82	
162,065	—	June 30	—	4%	" 4 p.c. Deb.	...	54—59	
992,045	Stk.	July 15	14	56/-	Brentford A Consolid.	261—266	72—75	
734,920	"	"	11	55/-	Do. B New	204—209	72—75	72—72½
55,000	"	"	5	5%	Do. 5 p.c. Pref.	109—111	68—72	73—74
221,400	"	June 15	4	4%	Do. 4 p.c. Deb.	91—93	57—59	
214,775	"	Aug. 26	11	10%	Brighton & Hove Orig.	208—213	119—124	118½—122
244,200	Stk.	"	8	7½%	Do. A Ord. Stk.	154—159	85—90	89—90
1,287,500	"	July 28	5	5%	Bristol 5 p.c. max.	...	22—24	22½—23½
530,000	20	Sept. 29	12½	10%	British	...	55—58	
120,000	Stk.	June 30	4	4%	Do. 4 p.c. Deb. Stk.	44—45	42—45	
845,771	"	"	4	4%	Buenos Aires 4 p.c. Deb.	88—90	6½—7½	6½
100,000	10	May 27	—	6%	Cape Town & Dis., Ltd.	85—87	43—45	
100,000	10	Oct. 28	—	4½%	Do. 4½ p.c. Pref.	1½—2½	4½—5½	
100,000	Stk.	June 30	4½	4½%	Do. 4½ p.c. Deb. Stk.	4—6	53—58	4 7/16—5
157,150	"	Feb. 26	5	5%	Chester 5 p.c. Ord.	70—75	...	
1,513,280	"	July 28	5/9/4	42/8	Commercial 4 p.c. Stk.	102—120	55—60	
560,000	"	"	5½	38/4	Do. 3½ p.c. do.	106—108	52—57	
475,000	"	June 15	5	3%	Do. 3 p.c. Deb. Stk.	103—105	44—47	
800,000	"	Dec. 11	4	—	Continental Union Ltd.	69½—71½	19—21	19—20½
200,000	"	"	7	—	Do. 7 p.c. Pref.	76—79	35—40	38—39
51,600	"	Aug. 26	15	15%	Croydon A 10 p.c.	115—118	160—165	
378,400	—	"	12	12%	Croydon B and C 7 p.c.	...	125—130	
498,370	Stk.	"	6	4½%	Derby Con. Stk.	125—125	...	
55,000	"	—	4	4%	Do. Deb. Stk.	102—104	...	
1,002,180	10	Jan. 29	10	5/0	European, Ltd.	17½—18	...	
16,398,975	Stk.	Aug. 11	4/17/4	46/8	Gas Light { 4 p.c. Ord.	98—102	63½—7	6½—6 29/32
2,600,000	"	"	3½	35/-	" 3½ p.c. max.	76—79	63½—6½	6⅛
4,062,355	"	"	4	4%	and { 4 p.c. Con. Pref.	96—99	40—49	46½—49
4,674,850	"	June 15	3	3%	Coke { 3 p.c. Con. Deb.	72½—74½	61—63	61⅛—62
130,000	"	Dec. 11	10	10%	" 10 p.c. Bonds.	...	51—53	51½—52½
82,500	"	Sept. 14	5	3½%	Hastings & St. L. 5 p.c.	...	...	
358,740	"	"	3½	2½%	Do. 3½ p.c.	87—89	48—50	
70,000	10	May 12	11	5%	Hongkong & China, Ltd.	16½—16⅝	38—40	
86,600	Stk.	Aug. 26	9	9½%	Hornsey 7 p.c.	...	5—6	
131,000	"	July 28	7½	7½%	Ilford A and C	...	100—105	102—102½
65,780	"	"	6½	5½%	Do. B	151—154	84—86	
65,500	"	June 30	4	4%	Do. 4 p.c. Deb.	115—118	61—63	
1,976,000	"	Oct. 28	9	5%	Imperial Continental	93—94	57—59	
1,233,000	"	Aug. 11	3½	3½%	Do. 3½ p.c. Deb. Red.	150—160	135—140	134½—130½
855,242	"	Mar. 30	6½	3½%	Lea Bridge Ord. 5 p.c.	84—86	83—85	83½—84
2,498,905	"	Feb. 26	10	57/6	Liverpool 5 p.c. Ord. { A.	119—121	72—74	
306,085	"	June 26	4	4%	" { B.	211—213	...	
165,796	"	Aug. 11	7/5/6	6%	Do. 4 p.c. Pr. Deb. Stk.	146—148	...	
63,480	"	Dec. 30	—	5%	Maidstone 5 p.c.	...	...	
75,000	5	June 11	6	5%	Do. 5 p.c. Deb.	...	54—56	
250,000	100	Oct. 3	4½	4½%	Malta & Mediterranean	...	40—43	
541,920	Stk.	Nov. 30	4	6%	Met. of { 4½ p.c. Deb.	4½—4¾	2—2½	2¼
1,875,892	"	July 28	4½	5%	Melbourne {	99—101	93—100	
539,705	"	June 30	5½	5½%	Monte Video, Ltd.	11½—12	53—58*	
15,000	10	Aug. 26	—	7/6	Newcastle & Gatsh'd Con.	98½—99½	63—65	
55,940	10	"	7/14/0	5/3	Do. 3½ p.c. Deb.	82—83	51—52	
300,000	Stk.	May 12	8	8%	North Middlesex 10 p.c.	...	12½—13½	
60,000	5	Mar. 26	10	1/-	" " 7 p.c.	14—15	7½—8½	
188,120	Stk.	June 30	—	3½%	Oriental, Ltd.	117—122	85—90	
60,000	50	Aug. 26	15	60/-	Ottoman, Ltd.	7½—7¾	2—3	
100,000	50	"	12	55/-	Plym'th & Stoneh'se 5 p.c.	...	64—67	
249,980	5	April 29	8	—	Portsea Island, B	128—131	64—67	
499,960	5	June 26	5	—	Do. C	128—131	51—54	
321,600	100	Dec. 1	4	4%	Primitiva Ord.	5½—6	1½—1¾	12/6—13/6
600,000	Stk.	July 28	4	4%	Do. 5 p.c. Pref.	4½—5	1½—2½*	39/—39/9
346,198	"	June 30	4	4%	Do. 4 p.c. Deb.	91—93	64—66*	
150,000	10	Sept. 29	4	4%	Do. " " 1911	...	42—45	
125,000	50	June 30	6	6/-	River Plate 4 p.c. Deb.	85—89	42—45	
135,000	Stk.	Aug. 26	5	5%	San Paulo { 6 p.c. Pref.	10½—11	6—6½	
209,984	"	"	10	5%	{ 5 p.c. Deb.	47—49	35—38	
525,500	"	"	10	5%	Sheffield A	223—224	62—64	
133,201	Stk.	Sept. 15	10	4½%	Do. B	223—224	62—64	
90,000	10	Oct. 28	4	4%	Do. C	220—222	62—64	
9,609,895	Stk.	July 28	9	8%	Shrewsbury 5 p.c.	...	...	
250,000	"	July 14	5/4/0	5%	South African	10½—11½	7—9	
1,895,445	"	"	—	5%	South Met. Ord.	111—113	69—72	69½—70½
224,820	"	Feb. 25	3	5%	Do. Red. Pref.	...	93—95	
1,087,795	"	Aug. 11	8½	7½%	Do. 5 p.c. Deb.	72½—74½	48—50	
368,837	"	June 30	6	5½%	South Shields Con. Stk.	157—159	88—90	
647,740	"	Nov. 16	5	5%	S'th Suburb'n Ord. 5 p.c.	114—116	70—73	70—71½
121,275	"	June 30	7½	4%	Do. 5 p.c. Deb. Stk.	116—118	73—76	
120,000	"	Aug. 11	4	4%	Southampton Ord.	99—102	55—58	
782,275	"	"	—	6%	Do. 4 p.c. Deb. Stk.	...	59—61	
181,255	"	"	6	4½%	Tottenham { A 5 p.c.	155—158	66—68	59—60
182,380	"	June 15	4	4%	District { B 3½ p.c.	115—117	56—58	67—67½
149,900	10	Dec. 30	5	5%	{ 4 p.c. Deb.	87—89	54—57	57—57½
236,476	Stk.	July 1	5	5%	Tuscan, Ltd.	5—6	1—2	
		Aug. 26	5	3½%	Do. 5 p.c. Deb. Red.	93—95	45—50	
30,000	..				Tynemouth 5 p.c. max.	108½—109	64—66	
253,636	..	Aug. 11	3½	66/3	Wandsworth, Wimbledon, and Epsom—			
108,075	..	"	6½	51/3	Wandsworth A 5 p.c.	151—156	78—80	
140,865	..	"	—	46/4½	Do. B 3½ p.c.	129—134	59—61	
352,000	..	"	—	46/4½	Do. C	...	56—58	
98,000	..	"	6½	45/-	New Ordinary	117—122	57—59	
88,476	..	June 30	6½	50/-	Wimbledon 5 p.c.	121—126	53—55	
			9	3%	Epsom 5 p.c.	66—60	56—58	
					4 p.c. Deb. Stk.		44—47	

* Ex Div.

Coke-Oven Gas Supply of Ossett.—Mention was made in the "JOURNAL" last month of the opening of a main to supply coke-oven gas to Ossett from the Crigglestone Collieries of the Benzole and Bye-Products Company. At the coke-ovens there is a booster which passes the gas at 2 lbs. pressure into an 8-in. steel main, which carries it to Ossett, a distance of 4¼ miles. At the works a meter registers the gas as it passes into a storage holder. From this, it passes through the purifiers into another holder, from which it is supplied to the town. The plant has been so adjusted that when it is necessary to work the retort-house the gas can be drawn from it, and also from the Tully plant, at the same time that the Crigglestone gas is extracted from the first holder; and these gases will be all mixed together, and passed through the purifiers. About 500,000 c.ft. of gas per 24 hours is at present being supplied from Crigglestone; but this quantity can be considerably increased later on. There are 25 p.ct. of the coke-ovens at Crigglestone at present under repair. When this work is completed, it is anticipated that the supply will be sufficient for all normal requirements, and that the retort-house, which is partly in operation at present, can then be closed-down.

Cast-iron pipes have been so considerably reduced in price (being less than half what they were twelve months ago) that public bodies are now in a position to resume mainlaying. The Leicester Corporation, for instance, have recently placed an order with the Staveley Coal & Iron Company, Ltd., of Chesterfield, for 2700 tons of 27-in. pipes.

At the request of the British Commercial Gas Association, it has been agreed by the Blackburn Town Council to give permission for a District Conference to be held at the Public Halls next April, and in connection therewith to authorize the Gas Engineer (Mr. G. P. Mitchell) to arrange for an exhibition of gas appliances at the same time.

In Blackpool there are 2630 street-lamps and 1023 electric lamps, 122½ miles of gas-mains and 168 miles of electric mains. Gas consumers total 18,677; prepayment meters 4244; and electricity consumers 4358. The gas-works last year used 55,823 tons of coal in making 831,202,000 c.ft. of gas. The output showed an increase of 8·24 p.ct. on the previous year. The electricity output was 19 p.ct. above the preceding year's total.

Great public interest has been manifested in an exhibition of modern gas lighting appliances now being held by the Alliance and Dublin Consumers' Gas Company at their Hawkins Street premises. The exhibition is varied, and demonstrates to the full the cheapness of gas for lighting, cooking, and other purposes. A feature is the contrast afforded by out-of-date burners and fittings placed side by side with modern fittings which can readily be substituted. In each case the comparative gas consumption is shown, with the increased lighting or other effect, and the saving in cost. Shop and church lighting is among the attractions; and another section is devoted to motor garage lamps. The Company have the assistance in the display of Messrs. William Sugg & Co., Ltd.

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United Kingdom	Advance Rate:	35/-	18/-	10/-
	Credit Rate:	40/-	21/-	11/6
Abroad (in the Postal Union) Payable in Advance		40/-	22/6	12/6

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